Santa Clara Valley Water District

Annual Groundwater Report

For Calendar Year 2015

TABLE OF CONTENTS

1 Introduction
Page 1

2 Groundwater Pumping, Recharge, and Water Balance
Page 5

3 Groundwater Levels and Storage
Page 18

4 Land Subsidence
Page 25

5 Groundwater Quality
Page 32

6 Other Groundwater Management Activities
Page 54

7 Conclusions
Page 57

Acknowledgements

PREPARED BY:

George Cook

UNDER THE DIRECTION OF:

James Fiedler
Chief Operating Officer, Water Utility Enterprise

Garth Hall
Deputy Operating Officer, Water Supply Division

Vanessa De La Piedra
Unit Manager, Groundwater Monitoring and Analysis Unit

CONTRIBUTORS:

Chanie Abuye
Henry Barrientos
Randy Behrens
Mike Duffy
Victoria Garcia
Ardy Ghoreishi
Simon Gutierrez
Bassam Kassab
Yaping Liu
Thomas Mohr
Roger Pierno
Xiaoyong Zhan

Student Interns:

Nima Mazhari
James Roman
Sophia Wendt

GRAPHICS DESIGN:
Cover and Table of Contents:

Benjamin Apolo III
Lana Gao

BOARD OF DIRECTORS:

Barbara Keegan
Chair, District 2

John Varela
Vice Chair, District 1

Richard P. Santos
District 3

Linda J. LeZotte
District 4

Nai Hsueh
District 5

Tony Estremera
District 6

Gary Kremen
District 7

TABLES

Table ES-1 2015 Groundwater Conditions as Compared to Other Indices ... iv
Table ES-2 Summary of 2015 Outcome Measure Performance and Action Plan ... vi
Table 1 CY 2015 Groundwater Pumping by Use (AF) ... 5
Table 2 Wells Reporting Groundwater Use in CY 2015 ... 5
Table 3 CY 2015 Groundwater Pumping Compared to Other Indices (AF) ... 8
Table 4 CY 2015 Managed Recharge (AF) ... 13
Table 5 Groundwater Elevations at Regional Index Wells (feet above mean sea level) ... 19
Table 6 Estimated End of Year Groundwater Storage (AF) ... 19
Table 7 Median Nitrate and TDS by Subbasin and Aquifer Zone (mg/L) ... 34
Table 8 Chloride, Nitrate, and TDS Trends (2001 - 2015) ... 37
Table 9 CY 2015 Domestic Well Testing Results ... 43
Table 10 CY 2015 Recharge Water Quality Sampling Locations ... 44
Table 11 Summary of Key Water Quality Indicators for All Recharge Systems Sampled in September 2015 ... 45
Table 12 Summary of Key Water Quality Indicators for All Recharge Systems Sampled in December 2015 ... 45
Table 13 2015 Groundwater Monitoring near Recycled Water Irrigation Sites ... 49
Table 14 Key Findings from Recycled Water Irrigation Site Monitoring ... 50
Table 15 2015 District Well Permit and Inspection Summary ... 54
Table 16 CY 2015 Groundwater Conditions as Compared to Other Indices ... 57
Table 17 Summary of Outcome Measure Performance and Action Plan ... 58

FIGURES

Figure 1 Santa Clara County Groundwater Subbasins ... 3
Figure 2 Groundwater Charge Zones ... 4
Figure 3 CY 2015 Zone W2 Groundwater Pumping ... 6
Figure 4 CY 2015 Zone W5 Groundwater Pumping ... 7
Figure 5 Countywide Groundwater Pumping and Managed Recharge ... 9
Figure 6 Countywide Water Use ... 9
Figure 7 Groundwater Pumping by Use Category ... 10
Figure 8 Percent of Total Pumping by Major Groundwater Users in 2015 ... 11
Figure 9 Countywide Groundwater Pumping and Recharge in CY 2015 ... 12
Figure 10 District Managed Recharge Facilities ... 14
Figure 11 Managed Recharge By Source ... 15
Figure 12 CY 2015 Groundwater Balance ... 17
Figure 13 CY 2015 Groundwater Level Monitoring ... 20
Figure 14 Groundwater Elevations at Regional Index Wells ... 21
Figure 15 Spring 2015 Groundwater Elevation Contours ... 22
Figure 16 Fall 2015 Groundwater Elevation Contours ... 23
Figure 17 CY 2015 Land Subsidence Monitoring ... 26
Figure 18 Cumulative Land Subsidence ... 27
Figure 19 Groundwater Levels at Subsidence Index Wells (feet above mean sea level) ... 29
Figure 20 CY 2015 Groundwater Quality Monitoring Wells ... 33
Figure 21 CY 2015 Water Supply Well Results With Regards to MCLs ... 35
Figure 22 Chloride Trends (2001 - 2015) ... 38
Figure 23 Nitrate Trends (2001 - 2015) ... 39
Figure 24 Total Dissolved Solids (TDS) Trends (2001 - 2015) ... 40
Figure 25 Groundwater and Salt Water Interaction in Shallow Aquifer ... 42
Figure 26 Groundwater Monitoring Near Facilities Using Recycled Water - Santa Clara Subbasin ... 47
Figure 27 Groundwater Monitoring Near Facilities Using Recycled Water - Llagas Subbasin ... 48

Executive Summary

This annual Groundwater Report describes groundwater use, levels, quality, storage, and land subsidence in the Santa Clara and Llagas Subbasins for Calendar Year (CY) 2015. Groundwater monitoring data are used to evaluate outcome measures identified in the District's Groundwater Management Plan (GWMP)[1]. These measures help evaluate performance in meeting **Board Water Supply Objective 2.1.1: "Aggressively protect groundwater from the threat of contamination and maintain and develop groundwater to optimize reliability and to minimize land subsidence and salt water intrusion."**

Groundwater provided approximately 42 percent of the water used in the county in CY 2015, the fourth year of California's ongoing drought. To help sustain and protect groundwater supplies, the District:

- Replenished groundwater with 54,900 acre-feet (AF) of local and imported surface water,
- Reduced groundwater demands by approximately 180,000 AF through treated water deliveries, water conservation, and water recycling,
- Conducted extensive monitoring of water levels, groundwater quality, and land subsidence,
- Implemented the well ordinance program and other programs to minimize threats to groundwater quality,
- Worked with basin stakeholders, land use agencies, and regulatory agencies to protect local groundwater resources, and
- Requested a 30% reduction in water use compared to 2013, which was nearly met, with an impressive 27% water use reduction in CY 2015.

Table ES-1 shows data for key indicators in CY 2015 as compared to CY 2014 and the last five years. Groundwater levels and storage were affected by ongoing extreme dry conditions, with about 26,300 AF[2] withdrawn from groundwater reserves in 2015. CY 2015 water levels slightly increased as compared to CY 2014 due to reduced pumping and increased recharge, with the exception of the Llagas Subbasin where water levels decreased because pumping did not vary much between CY 2014 and 2015. Water levels were well above historical minimums in all groundwater level index wells. Estimated end of 2015 total groundwater storage was 229,100 AF, which falls in the "Severe" stage (Stage 3) of the District's Water Shortage Contingency Plan. Groundwater quality remained very good with the exception of nitrate in South County.

North County Groundwater Summary

Groundwater use in the Santa Clara Plain was 66,300 AF, a 42% decrease from CY 2014. Pumping locations and use remained relatively stable, with nearly all groundwater used for municipal and industrial (M&I) purposes. Groundwater levels recovered slightly due to increased recharge and reduced pumping, and were above historical lows. Groundwater levels in the Santa Clara Plain were also above thresholds established to minimize the risk of land subsidence in CY 2015. Estimated groundwater storage at the end of 2015 was 214,800 AF, which was 19,800 AF lower than CY 2014.

[1] Santa Clara Valley Water District, Groundwater Management Plan, July 2012

[2] Groundwater storage estimates presented in this report are as of March 2016, and are refined as additional data becomes available.

North County groundwater is generally of very high quality. In CY 2015, 99% of water supply wells tested met all health-based drinking water standards. The only exceptions were two domestic wells in which nitrate exceeded the drinking water standard. Public water systems must comply with drinking water standards, which may require treatment or blending prior to delivery.

South County Groundwater Summary

Groundwater pumping in the Coyote Valley and Llagas Subbasin was 9,900 AF and 42,200 AF, respectively. Pumping in the South County decreased by 4% in Coyote Valley and 3% in the Llagas Subbasin compared to 2014. The distribution of pumping for M&I, domestic, and agricultural uses was similar to CY 2014. 2015 Groundwater levels were lower than 2014 levels in the Llagas Subbasin, but remained well above historical lows at index wells. Estimated groundwater storage in South County at the end of 2015 was 14,300 AF, which is 6,500 AF lower than 2014.

Groundwater quality in South County is generally good with the exception of nitrate, which remains the primary groundwater protection challenge due to historic and ongoing sources. Nitrate was detected above the drinking water standard in about 23% of South County water supply wells tested (primarily domestic wells). For this reason, the outcome measure related to drinking water standards was not met. The District continues to offer basic well testing (including nitrate) to eligible domestic well owners. As part of the Safe Clean Water Program, the District also approved five nitrate treatment system rebates for domestic well users exposed to elevated nitrate.

The occurrence of perchlorate in the Llagas Subbasin from a former highway safety flare plant has been substantially reduced due to ongoing managed recharge and removal of perchlorate from the source area. The perchlorate plume, which once extended about 10 miles from Morgan Hill to Gilroy, now extends approximately 3 miles to the San Martin Airport. The District continues to closely monitor related activities and advocate for expedited and thorough cleanup.

Remainder of Page Intentionally Left Blank

Table ES-1 2015 Groundwater Conditions as Compared to Other Indices

Index[1]	2015	Compared to 2014	Compared to Last 5 Years (2010 - 2014)
Managed Recharge (AF)	54,900	Up 113%	Down 35%
Groundwater Pumping (AF)	118,500	Down 30%	Down 17%
Groundwater as % of Total Water Use	42%	Down 9%	No Change
Groundwater Levels (feet)[2]			
Santa Clara Plain	49.8	Up 20%	Down 23%
Coyote Valley	259.3	Up 1%	Down 2%
Llagas Subbasin	188.9	Down 2%	Down 14%
End of Year Groundwater Storage (AF)	229,100	Down 10%	--
Land Subsidence (feet/year)[3]	0.005	Decrease	--
Groundwater Quality[4]			
Santa Clara Plain – Median TDS, mg/L	400	No Change[5]	No Change
Coyote Valley – Median TDS, mg/L	380	No Change	No Change
Llagas Subbasin – Median TDS, mg/L	371	No Change	No Change
Santa Clara Plain –Median Nítrate, mg/L	13	No Change	Decrease
Coyote Valley – Median Nitrate, mg/L	23.8	No Change	No Change
Llagas Subbasin – Median Nitrate, mg/L	28.6	No Change	No Change

1. Groundwater levels and quality are shown for three groundwater management areas: the Santa Clara Plain and Coyote Valley (which comprise the Santa Clara Subbasin) and the Llagas Subbasin.
2. Groundwater elevations represent the average of all readings at groundwater level -index wells for the time period noted.
3. The established tolerable rate of 0.01 feet per year was not exceeded. Water levels at all subsidence index wells were above these thresholds throughout 2015.
4. Values shown represent median groundwater quality for all principal aquifer zone wells tested. Nitrate is measured as NO_3. Data from shallow monitoring wells is excluded, including wells with high TDS due to saline intrusion.
5. Individual wells sampled for TDS and nitrate vary each year so a straight numeric comparison of median values is not performed. “No change” indicates no significant difference using an appropriate statistical test (Mann-Whitney Test) at 95% confidence level. An entry of either “Increase” or “Decrease” indicates a statistically significant change for the time period indicated.

Outcome measures related to groundwater storage, land subsidence, and water quality were met, with the exception of groundwater storage, nitrate, and chloride. Table ES-2 summarizes outcome measure performance and recommended actions to address measures not being met.

Groundwater Outlook

Groundwater levels and storage have begun to recover with improved rainfall and increased surface water available for managed recharge in CY 2015. Groundwater storage has been critical in helping to meet the county’s water supply needs during the ongoing drought. The estimated end of year storage for 2015 was below the 300,000 AF target but water levels did not exceed subsidence thresholds in related index wells. In accordance with the Water Shortage Contingency Plan, the District Board set a 30% water use reduction target (compared to 2013) in March 2015. The water use reduction target was adjusted to 20% in June 2016 due to improved water supply conditions.

The District continues to actively monitor groundwater levels, land subsidence, and water quality to support operational decisions and ensure groundwater resources are protected. To help ensure water supply reliability, the District is also working to expedite several Indirect Potable Reuse (IPR) projects to provide a drought-proof source of purified water for groundwater replenishment. The District will also continue to track proposed legislation, policies, and regulatory standards that may impact groundwater resources or the District's ability to manage them.

Compliance with the Sustainable Groundwater Management Act (SGMA) will be a major focus of District groundwater management in CY 2016. The District was deemed the exclusive Groundwater Sustainability Agency (GSA) for the Santa Clara and Llagas Subbasins on June 22, 2016 by the California Department of Water Resources (DWR). The District's scientific basin boundary modification request for the Llagas Subbasin was recently approved by DWR and will be included in a revised DWR Bulletin 118 in late 2016. The District will update the 2012 Groundwater Management Plan for submittal to DWR as an Alternative to a Groundwater Sustainability Plan under SGMA.

Remainder of Page Intentionally Left Blank

Table ES-2 Summary of 2015 Outcome Measure Performance and Action Plan

Groundwater Storage	**OM 2.1.1.a.** Greater than 278,000 AF of projected end of year groundwater storage in the Santa Clara Plain. Estimated end of 2015 Storage: 214,800 AF **OM 2.1.1.b.** Greater than 5,000 AF of projected end of year groundwater storage in the Coyote Valley. Estimated end of 2015 Storage: 400 AF **OM 2.1.1.c.** Greater than 17,000 AF of projected end of year groundwater storage in the Llagas Subbasin. Estimated end of 2015 Storage: 13,900 AF
	Action Plan for OM 2.1.1.a, b, and c: In accordance with the Water Shortage Contingency Plan, the District Board of Directors called for a 30% countywide water use reduction in March 2015. In June 2016, this was adjusted to 20% in light of improved supplies.
Groundwater Levels and Subsidence	**OM 2.1.1.d.** 100% of subsidence index wells groundwater levels above subsidence thresholds. All ten subsidence index wells had groundwater levels above thresholds in 2015.
Groundwater Quality	**OM 2.1.1.e.** At least 95% of countywide water supply wells meet primary drinking water standards. Only 84% of countywide water supply wells tested in 2015 met primary drinking water standards due to elevated nitrate in South County (mainly in domestic wells). If nitrate is not included, 100% of water supply wells met primary drinking water standards. **OM 2.1.1.f.** At least 90% of South County wells meet Basin Plan agricultural objectives. Nearly all wells (98%) met Basin Plan agricultural objectives.
	Action Plan for OM 2.1.1.e: Implement Salt and Nutrient Management Plans to address salt loading, continue free testing program for domestic wells, and work to increase participation in the nitrate treatment system rebate program.
Groundwater Quality Trends	**OM 2.1.1.g.** At least 90% of wells in both the shallow and principal aquifer zones have stable or decreasing concentrations of nitrate, chloride, and total dissolved solids. This measure is nearly met for chloride, with 84% of wells showing stable or decreasing concentrations. This measure is met for nitrate and total dissolved solids as stable or decreasing concentrations were observed in 93% and 94% of wells, respectively.
	Action Plan for OM 2.1.1.g: Implement Salt and Nutrient Management Plans to address salt loading.

Outcome measure met
Outcome measure not met

1. INTRODUCTION

The Santa Clara Valley Water District (District) has the responsibility and authority to manage the Santa Clara and Llagas Subbasins in Santa Clara County per an act of the California legislature[3]. The District's objectives and authority related to groundwater management are to recharge groundwater basins, conserve, manage and store water for beneficial and useful purposes, increase water supply, protect surface water and groundwater from contamination, prevent waste or diminution of the District's water supply, and do any and every lawful act necessary to ensure sufficient water is available for present and future beneficial uses.

The District Board of Directors (Board) adopted Water Supply Objective 2.1.1, which reflects the mission to protect groundwater resources: ***"Aggressively protect groundwater from the threat of contamination and maintain and develop groundwater to optimize reliability and to minimize land subsidence and salt water intrusion."*** Pursuant to the District Act and Board policy, the District has identified the following basin management objectives in the Groundwater Management Plan (GWMP)[4]:

- Groundwater supplies are managed to optimize water supply reliability and minimize land subsidence.
- Groundwater is protected from existing and potential contamination, including salt water intrusion.

Purpose

This annual report describes groundwater conditions in Santa Clara County for Calendar Year (CY) 2015 including groundwater use, water levels, storage, quality, and land subsidence. The following outcome measures (OM) derived from the GWMP are also assessed to evaluate performance in meeting Water Supply Objective 2.1.1:

- OM 2.1.1.a. Greater than 278,000 AF[5] of projected end of year groundwater storage in the Santa Clara Plain.
- OM 2.1.1.b. Greater than 5,000 AF of projected end of year groundwater storage in the Coyote Valley.
- OM 2.1.1.c. Greater than 17,000 AF of projected end of year groundwater storage in the Llagas Subbasin.
- OM 2.1.1.d. 100% of subsidence index wells with groundwater levels above subsidence thresholds.
- OM 2.1.1.e. At least 95% of countywide water supply wells meet primary drinking water standards.
- OM 2.1.1.f. At least 90% of South County wells meet Basin Plan agricultural objectives.
- OM 2.1.1.g. At least 90% of wells in both the shallow and principal aquifer zones have stable or decreasing concentrations of nitrate, chloride, and total dissolved solids.

Study Area

This report presents information for the Santa Clara and Llagas Subbasins, which are managed by the District and are identified by DWR as Subbasins 2-9.02 and 3-3.01, respectively (Figure 1). The District divides the Santa Clara Subbasin into two groundwater management areas: the Santa Clara Plain and the Coyote Valley due to land use and management characteristics. Both the Santa Clara Plain and Llagas Subbasin have confined and recharge areas. Within the confined areas, low permeability clays and silts separate shallow and principal aquifers, with the latter defined as aquifer materials greater than about 150 feet below ground surface.

---

[3] Santa Clara Valley Water District Act, Water Code Appendix, Chapter 60.
[4] Santa Clara Valley Water District, Groundwater Management Plan, July 2012.
[5] AF = acre-feet. One acre-foot is equal to 325,900 gallons.

DWR is currently considering revisions to basin boundaries as allowed by SGMA. DWR conducted an internal review and is proposing to revise the boundaries of both the Santa Clara and Llagas Subbasins to correspond with the San Mateo, Alameda, and San Benito county lines. The District submitted a request to DWR to modify the eastern boundary of the Llagas Subbasin, which was recently approved by DWR. The eastern portion of the Llagas Subbasin as currently defined by DWR is underlain by bedrock and sediments that do not contain significant quantities of groundwater. Figure 1 illustrates the current DWR basin boundaries and the area proposed to be removed. The figures in this report will present the revised Llagas Subbasin.

The information in this report is summarized by groundwater management area or by groundwater charge zone (Figure 2). Charge Zone W-2 (North County) generally coincides with the Santa Clara Plain, while Zone W-5 generally overlaps the combined area of the Coyote Valley and Llagas Subbasin.

Report Content

In addition to this Introduction, this Annual Groundwater Report for 2015 includes the following chapters:

- Chapter 2: Groundwater Pumping, Recharge, and Water Balance
- Chapter 3: Groundwater Levels and Storage
- Chapter 4: Land Subsidence
- Chapter 5: Groundwater Quality
- Chapter 6: Other Groundwater Management Activities
- Chapter 7: Conclusions

Remainder of Page Intentionally Left Blank

Figure 1 Santa Clara County Groundwater Subbasins

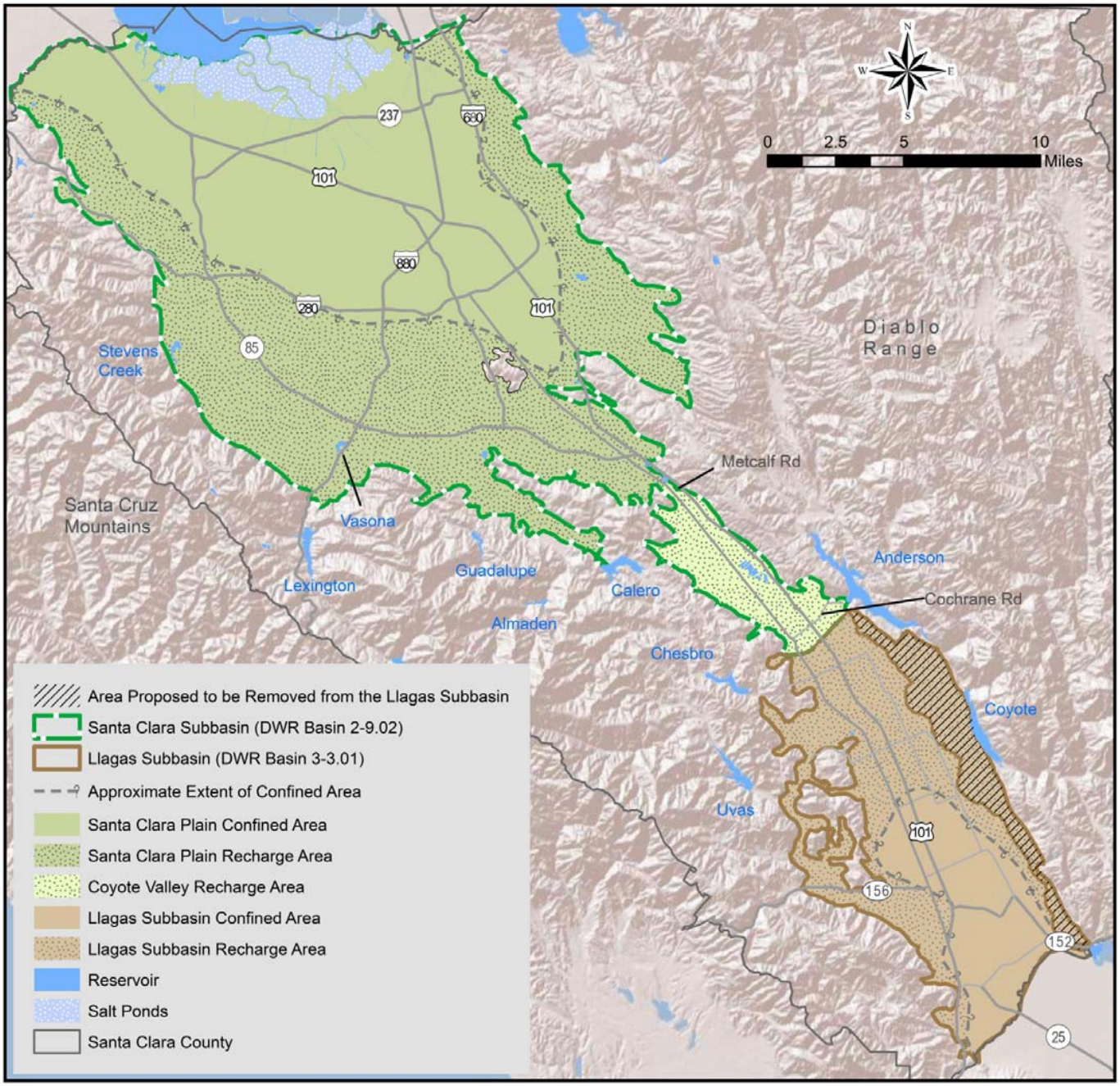
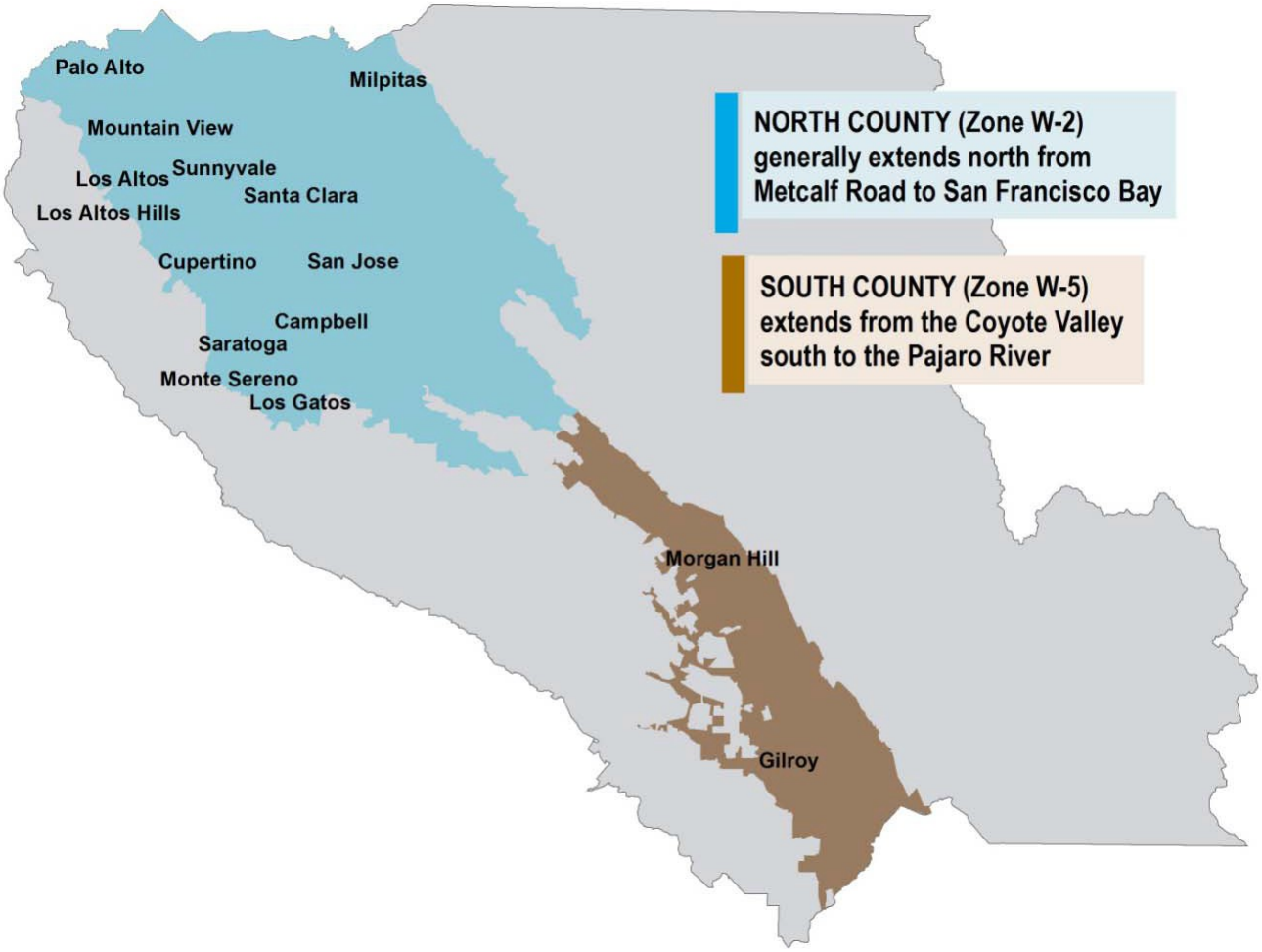


Figure 2 Groundwater Charge Zones



2. GROUNDWATER PUMPING, RECHARGE, AND WATER BALANCE

Countywide groundwater pumping in CY 2015 was 118,500 acre-feet (AF), providing about 42 percent of the water used by county residents and businesses. Compared to CY 2014, groundwater pumping decreased 42 percent in the Santa Clara Plain, 5 percent in Coyote Valley, and 3 percent in the Llagas Subbasin. Due to dry conditions and limited surface water supplies, the District operated a limited managed recharge program, using about 55,000 AF of local and imported water to replenish the groundwater subbasins. In-lieu recharge, including treated water deliveries, recycled water use, and water conservation programs reduced demands on groundwater by approximately 180,000 AF.

The primary inflow to the subbasins was managed recharge, providing over 57% of total inflow. Groundwater pumping accounted for over 96% of the subbasin outflows. Due to ongoing dry conditions, outflows exceeded inflows, resulting in a net decrease in storage of about 26,300 AF between 2014 and 2015.

2.1 Groundwater Pumping

Approximately 118,500 AF of groundwater was pumped in Santa Clara County in CY 2015, compared to 168,400 AF in CY 2014. Figures 3 and 4 show the location and volume of CY 2015 groundwater pumping, and Table 1 summarizes pumping by area and use category.

Table 1 CY 2015 Groundwater Pumping by Use (AF)

Use	Zone W-2 North County	Zone W-5 South County		Total
	Santa Clara Plain	Coyote Valley	Llagas Subbasin	
Municipal & Industrial (M&I)	65,450	6,460	16,930	88,840
Domestic	350	220	2,240	2,810
Agricultural	530	3,270	23,050	26,850
Total	**66,330**	**9,950**	**42,220**	**118,500**

Groundwater in North County is used primarily for M&I purposes, with minimal agricultural or domestic use. In South County, agricultural use is more significant. This is especially evident in the Llagas Subbasin, where more than half of the use is for agriculture. While the quantity of groundwater used for domestic purposes is relatively small in South County, there are a large number of individual wells that reported groundwater use (Table 2).

Table 2 Wells Reporting Groundwater Use in CY 2015

Use	Zone W-2 North County	Zone W-5 South County	
	Santa Clara Plain	Coyote Valley	Llagas Subbasin
Municipal & Industrial (M&I)	756	58	261
Domestic	399	336	2,716
Agricultural	42	92	577

Note: Some wells may report pumping for more than one use category (e.g., domestic and agricultural).

Figure 3 CY 2015 Zone W2 Groundwater Pumping

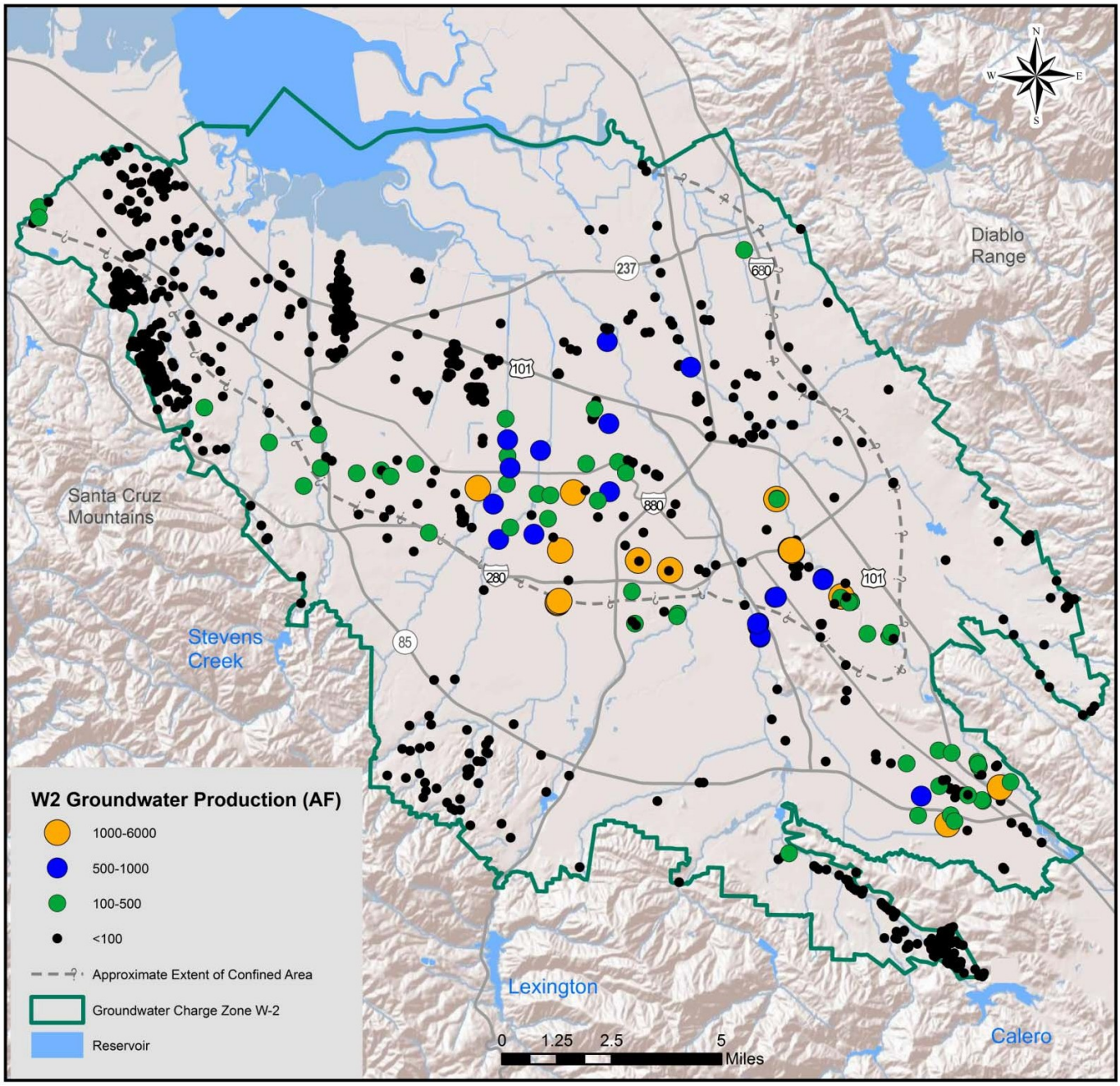
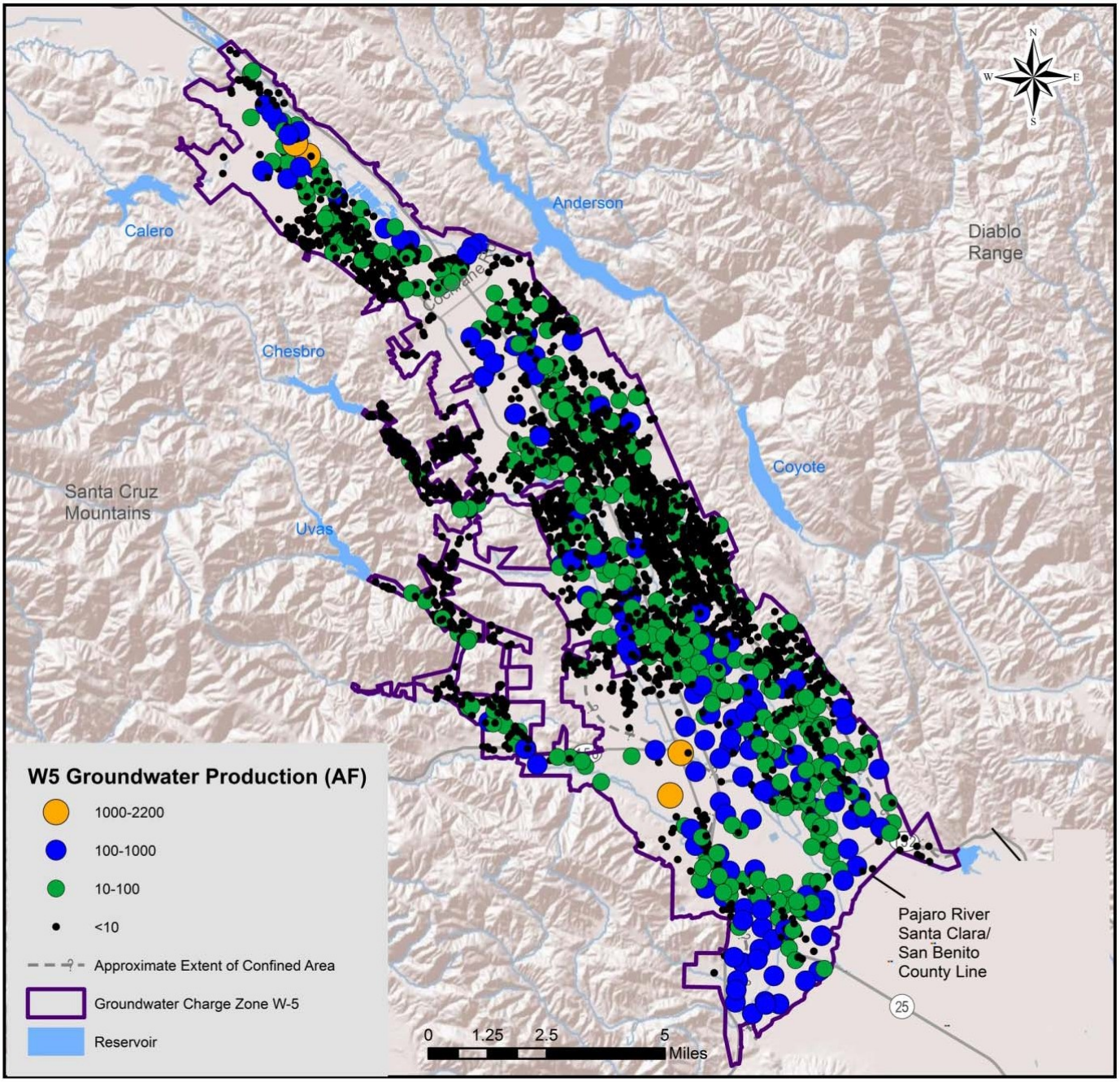


Figure 4 CY 2015 Zone W5 Groundwater Pumping



Groundwater Pumping Trends

Groundwater pumping is largely offset by the District's managed recharge of local and imported surface water in normal or wet years (Figure 5). Over the last 25 years, managed recharge has averaged 65% of the amount of groundwater pumped.

Total water use decreased in CY 2015 in all three groundwater areas due to water use reduction efforts in response to the drought. Countywide groundwater pumping was down approximately 30% from the previous year (Table 3). Groundwater use decreased 42%, 4% and 3% in the Santa Clara Plain, Coyote Valley, and Llagas Subbasin, respectively. Since groundwater is the only potable water supply for the Coyote Valley and Llagas Subbasin, the decrease in total water use is reflected in pumping. Figure 6 shows the countywide water use by source, including groundwater, treated water, SFPUC supplies, local surface water and recycled water. Groundwater provided about 42% of the total water used countywide in CY 2015.

Groundwater pumping and use patterns over time are shown in Figure 7 for each of the groundwater management areas. In the Santa Clara Plain, a significant drop in groundwater pumping is noted in the late 1980s following completion of the District's Santa Teresa Water Treatment Plant (WTP). Since then, pumping has averaged about 100,000 AF per year in the Santa Clara Plain. A notable increase in pumping in the Coyote Valley occurred in 2006 when a water retailer installed new wells and began extracting water to serve customers in the Santa Clara Plain. This increased the average annual pumping volume by about 5,000 AF. Pumping in the Llagas Subbasin has remained relatively stable over the period of record.

Major Groundwater Users

The largest groundwater users in each charge zone are shown on Figure 8. Water retailers are the primary users in North County, accounting for over 88% of all pumping. San Jose Water Company is the largest individual user, followed by other retailers and a few large industrial users. Unlike North County, about half of pumping in South County is from numerous individual pumpers including agricultural and domestic users. In South County, water retailer pumping accounts for about 33% of groundwater use. Other large users include golf courses and industrial users.

Table 3 CY 2015 Groundwater Pumping Compared to Other Indices (AF)

Groundwater Subbasin/Area	2015	2014	5 Year Average (2010-2014)	Period of Record (Average)
Santa Clara Subbasin, Santa Clara Plain	66,300	114,500	88,400	114,900
Santa Clara Subbasin, Coyote Valley	10,000	10,400	11,700	8,700
Llagas Subbasin	42,200	43,500	42,800	42,700
Total	**118,500**	**168,400**	**142,900**	**166,300**

Note: The period of record is 1981-2015 for the Santa Clara Plain and 1988-2015 for Coyote Valley and Llagas Subbasin.

Figure 5 Countywide Groundwater Pumping and Managed Recharge

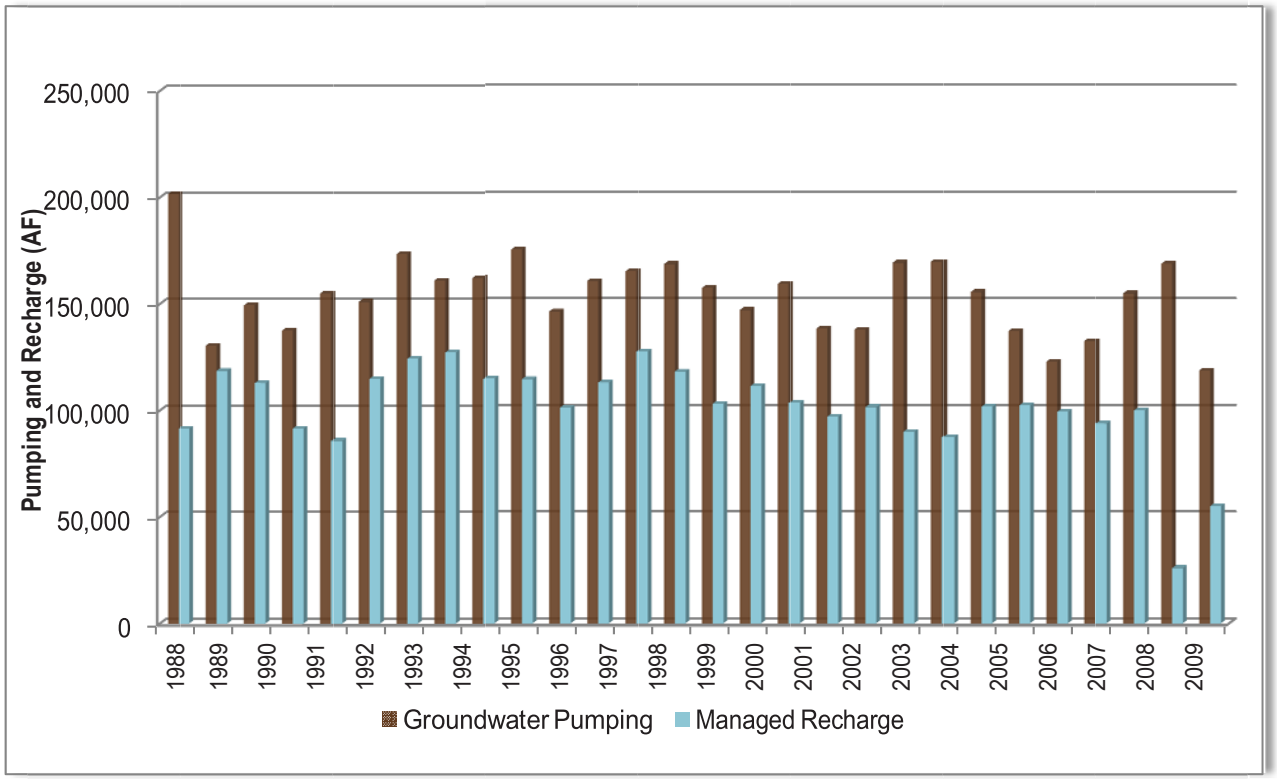


Figure 6 Countywide Water Use

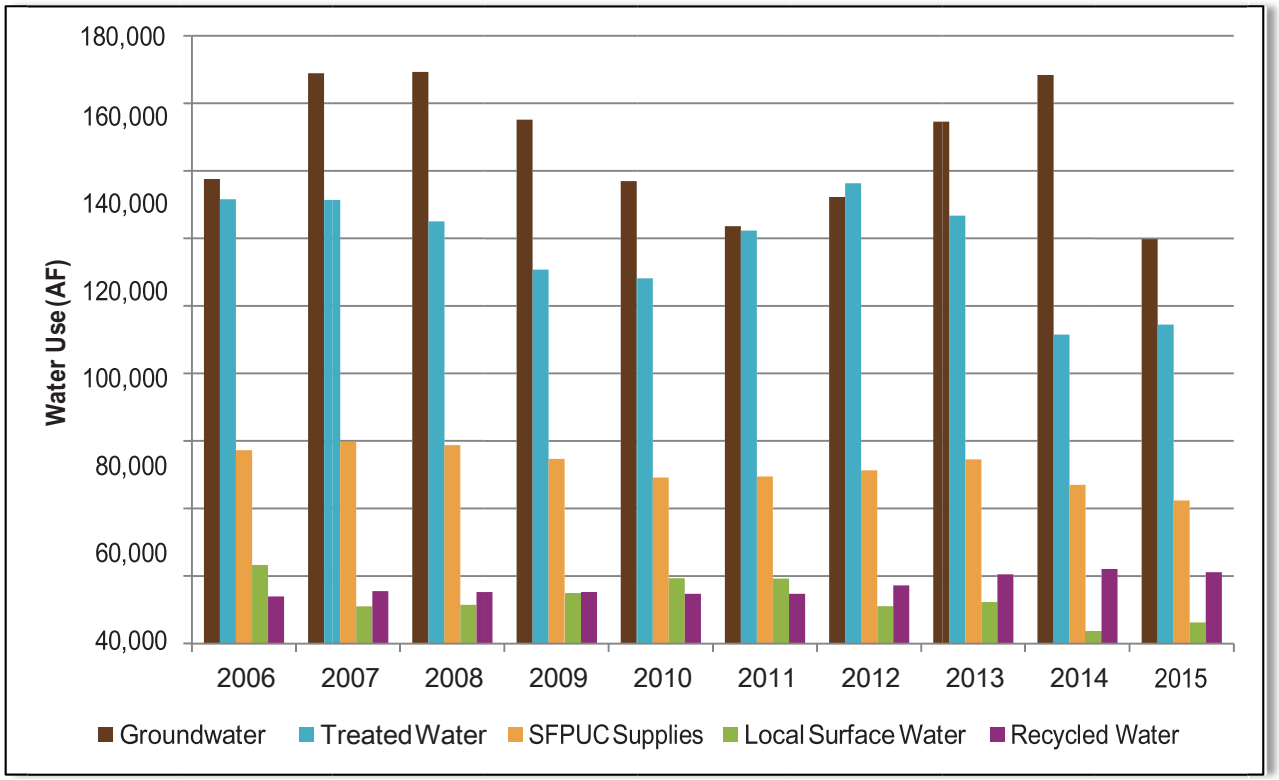
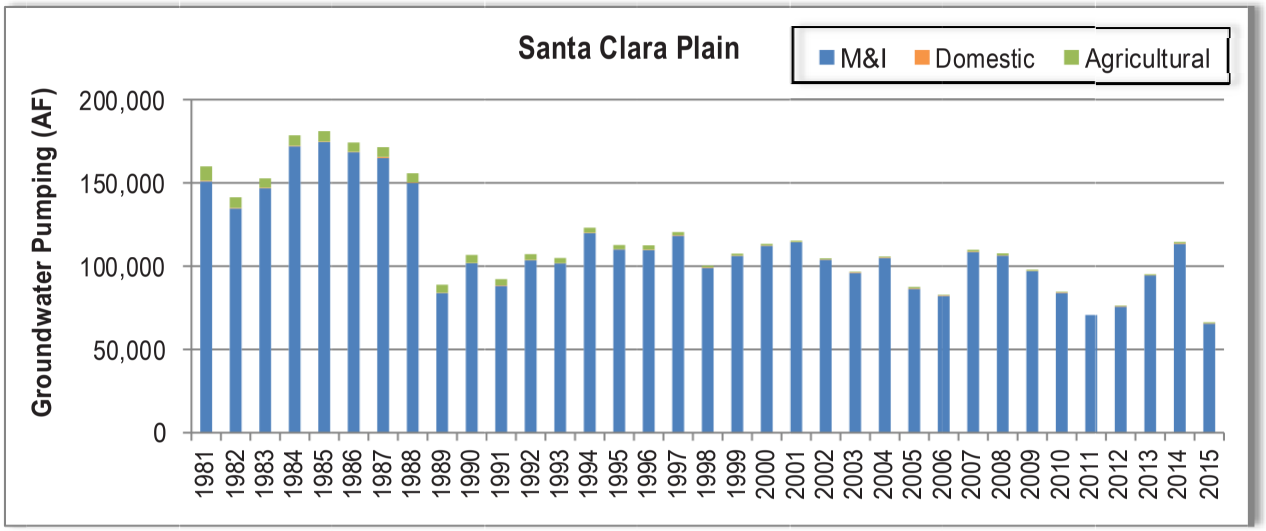
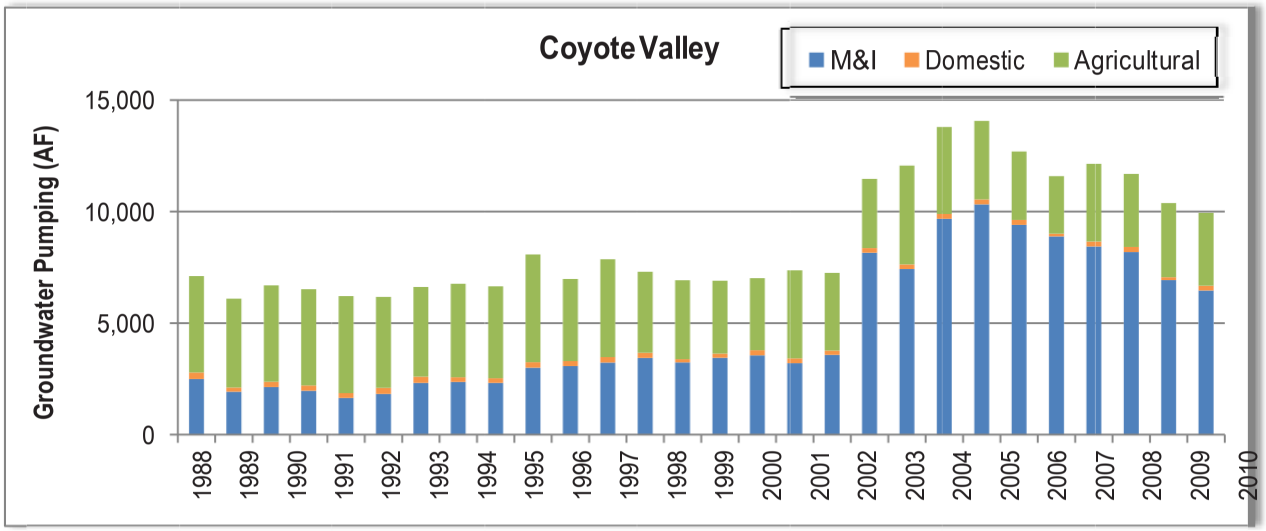


Figure 7 Groundwater Pumping by Use Category





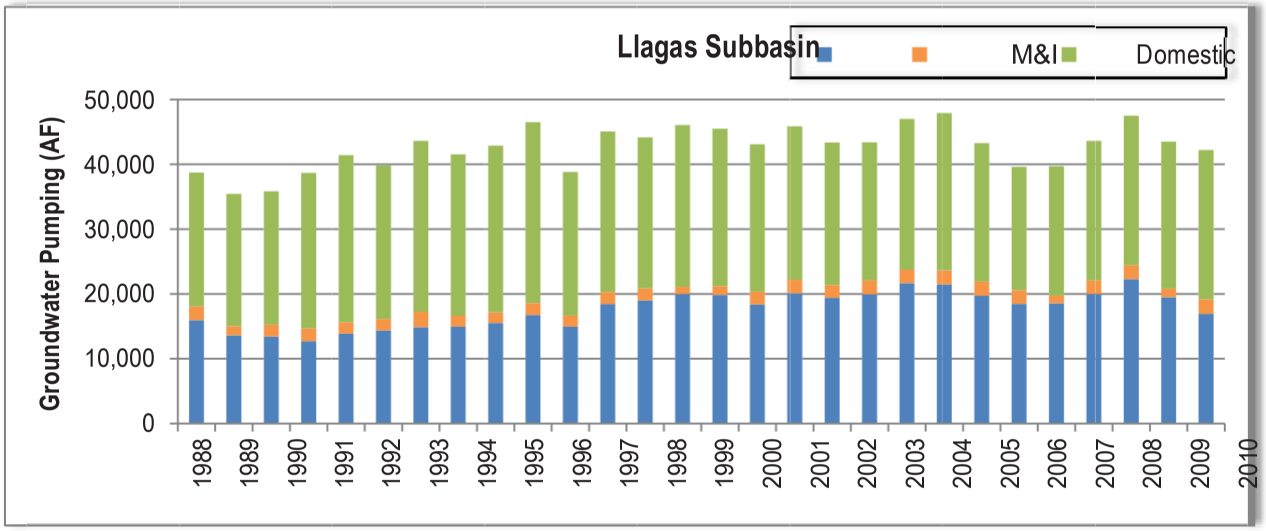
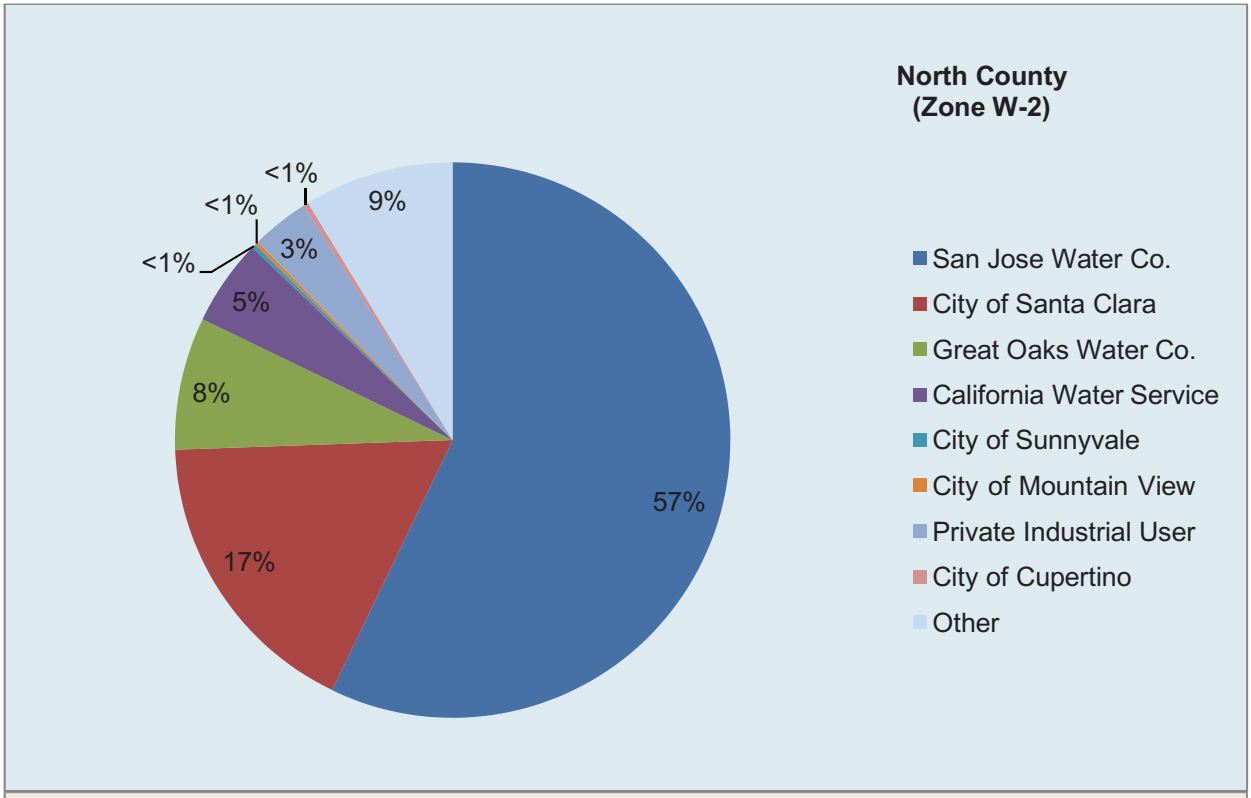
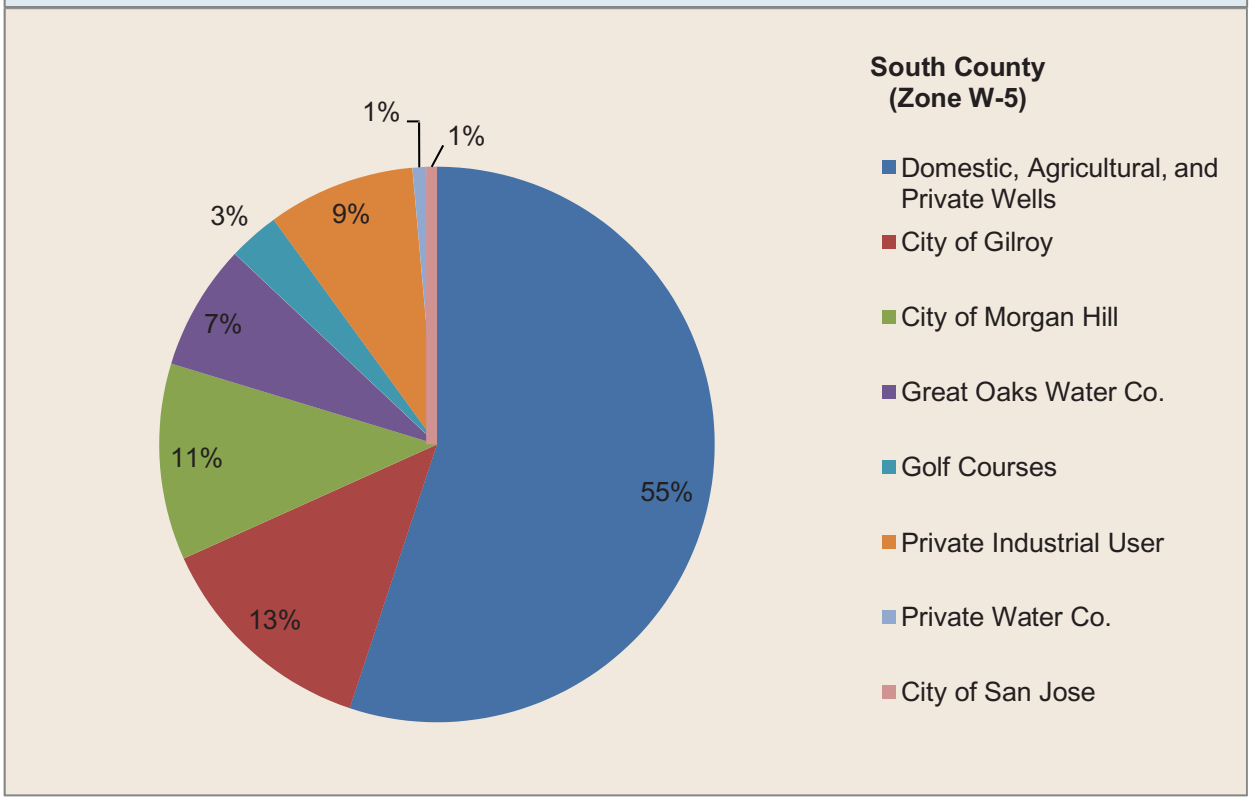


Figure 8 Percent of Total Pumping by Major Groundwater Users in 2015

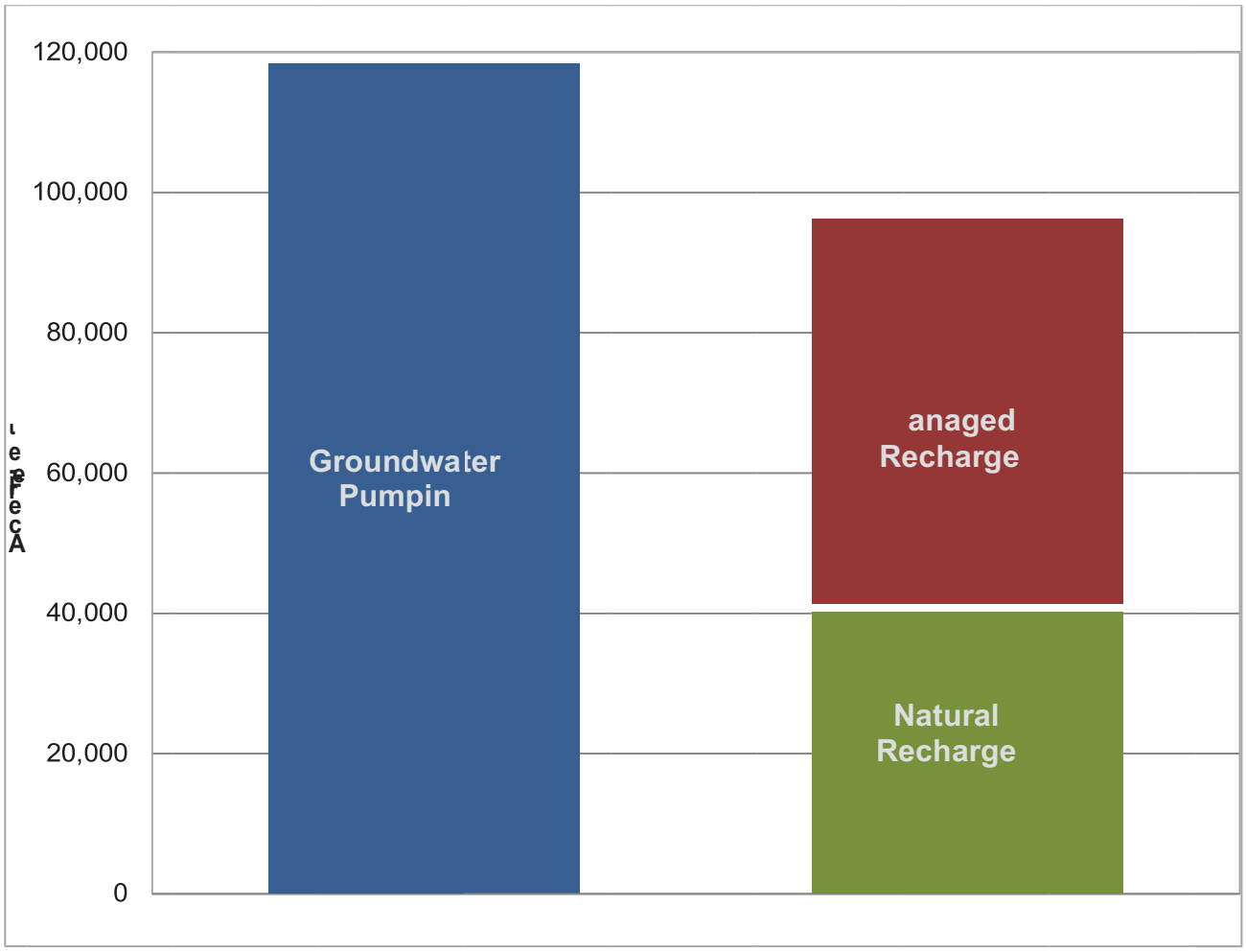




2.2 Groundwater Recharge

Since the 1930s, the Distric's water supply strategy has been to maximize the conjunctive management of surface water and groundwater. The annual amount of groundwater pumped far exceeds what is replenished naturally by rainfall, so the District's managed recharge and in-lieu recharge activities are critical to ensuring water supply reliability (Figure 9). Groundwater pumping exceeded total recharge in 2015 due to the reduced availability of surface water for managed recharge as a result of continued dry conditions.

Figure 9 Countywide Groundwater Pumping and Recharge in CY 2015



Managed Recharge

The District replenishes the groundwater subbasins with imported water and local runoff captured in 10 local reservoirs. District recharge facilities include more than 300 acres of recharge ponds and over 90 miles of creeks (Figure 10). Imported sources include the federal Central Valley Project (CVP) and the State Water Project (SWP). The use of imported or local water for managed recharge in a given year depends on a number of factors including hydrology,

imported water allocations, treatment plant demands, and environmental needs. In general, a greater percentage of local water is used for recharge in wet years due to increased capture of local storm runoff in local reservoirs.

About 54,900 AF of local and imported water was recharged through District facilities in CY 2015 (Table 4). This represents only about 50% of the managed recharge program in normal years. The low recharge volume was due to limited supplies of local and imported surface water due to continued drought. Approximately 62% of the District managed recharge was in-stream recharge. Approximately equal amounts of local and imported water were recharged in South County, while imported water accounted for about 83% of the water recharged in North County (Figure 11).

Table 4 CY 2015 Managed Recharge (AF)

Zone	In-Stream Recharge (Creeks)	Off-Stream Recharge (Recharge Ponds)	Total
W-2 (North County)	11,600	16,600	28,200
W-5 (South County)	22,300	4,400	26,700
Total	33,900	21,000	54,900

The District's 10 reservoirs were constructed in the 1930s and 1950s. Based on recent seismic studies, operating restrictions have been imposed on several District reservoirs while seismic stability concerns are mitigated. This limits the amount of water that can be stored for groundwater recharge, but is needed to provide an adequate level of safety to the public downstream and prevent the uncontrolled release of water while related retrofit projects to strengthen the dams are implemented. Major upcoming capital projects include seismic retrofit of Anderson, Calero, Guadalupe, and Almaden dams.

In-Lieu Recharge

The District's treated surface water deliveries, water conservation, and recycled water programs play a critical role in maintaining groundwater storage by reducing demand on groundwater. In 2015, treated water and recycled water provided about 94,500 and 20,000 AF of water, respectively. The District's long-term water conservation programs also saved approximately 64,000 AF[6].

The District's Silicon Valley Advanced Water Purification Center began operating in 2014. This state-of-the-art facility in San Jose produces up to 8 million gallons per day of highly purified water by treating tertiary-treated recycled water with microfiltration, reverse osmosis, and ultraviolet light. Purified water is blended with tertiary treated recycled water to lower the salt content of recycled water used for landscape irrigation and industrial uses. This facility supports the District's goal of expanding the use of recycled water, which reduces the demand on groundwater.

[6] Santa Clara Valley Water District, Protection and Augmentation of Water Supplies, FY 2016-17, 45th Annual Report, February 2016.

Figure 10 District Managed Recharge Facilities

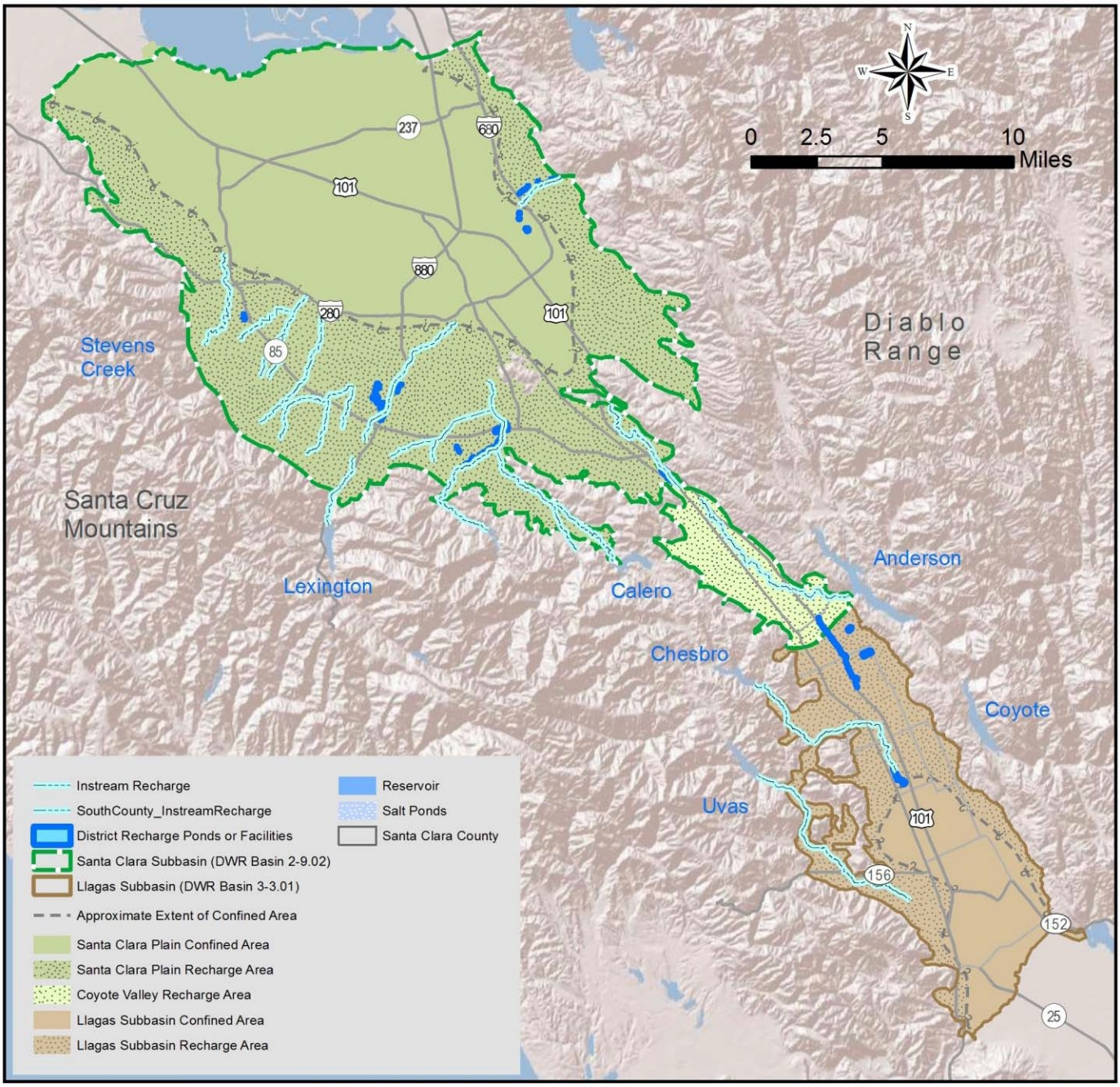
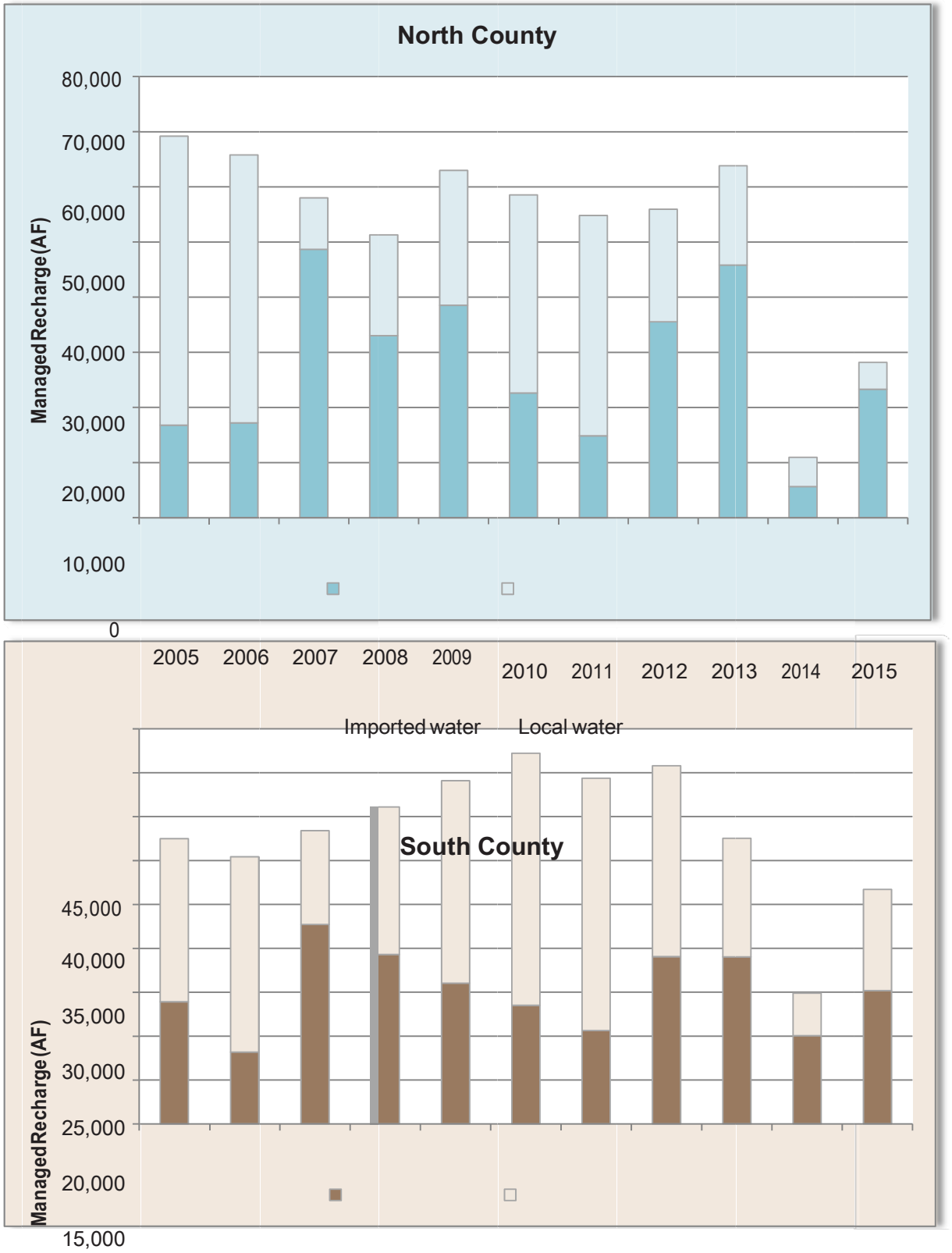
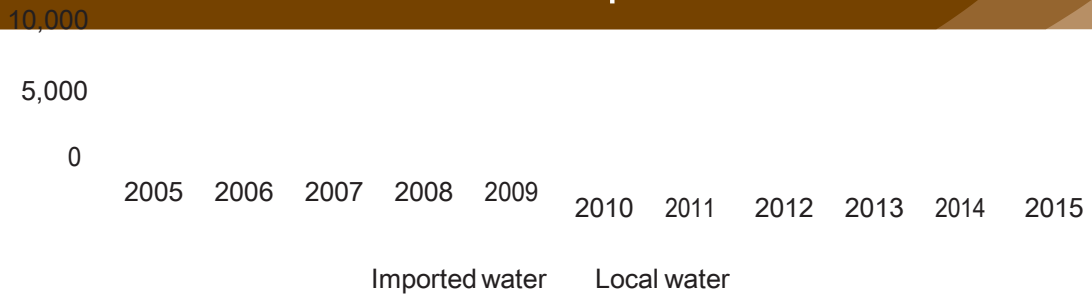


Figure 11 Managed Recharge By Source




10,000
5,000
0
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
Imported water
Local water

2.3 Groundwater Balance

The groundwater balance provides an assessment of annual inflows and outflows for the Santa Clara Plain, Coyote Valley, and Llagas Subbasin, as shown in Figure 12. It should be noted that some terms presented in the groundwater balance cannot be directly measured and represent estimated values from the District's groundwater flow models.

Inflows

Major inflows to the subbasins are primarily controlled by hydrologic conditions and include:

- Managed recharge by the District using local and imported surface water, and
- Natural recharge, which includes deep percolation of rainfall, natural seepage through creeks, subsurface inflow from adjacent aquifer systems (Coyote Valley and Bolsa Subbasin), and return flows from septic systems and irrigation.

Total inflows to the subbasins were 96,300 AF in 2015, with natural recharge and other inflows providing about 43% of the total. Managed recharge provided about 57% of total inflows.

Outflows

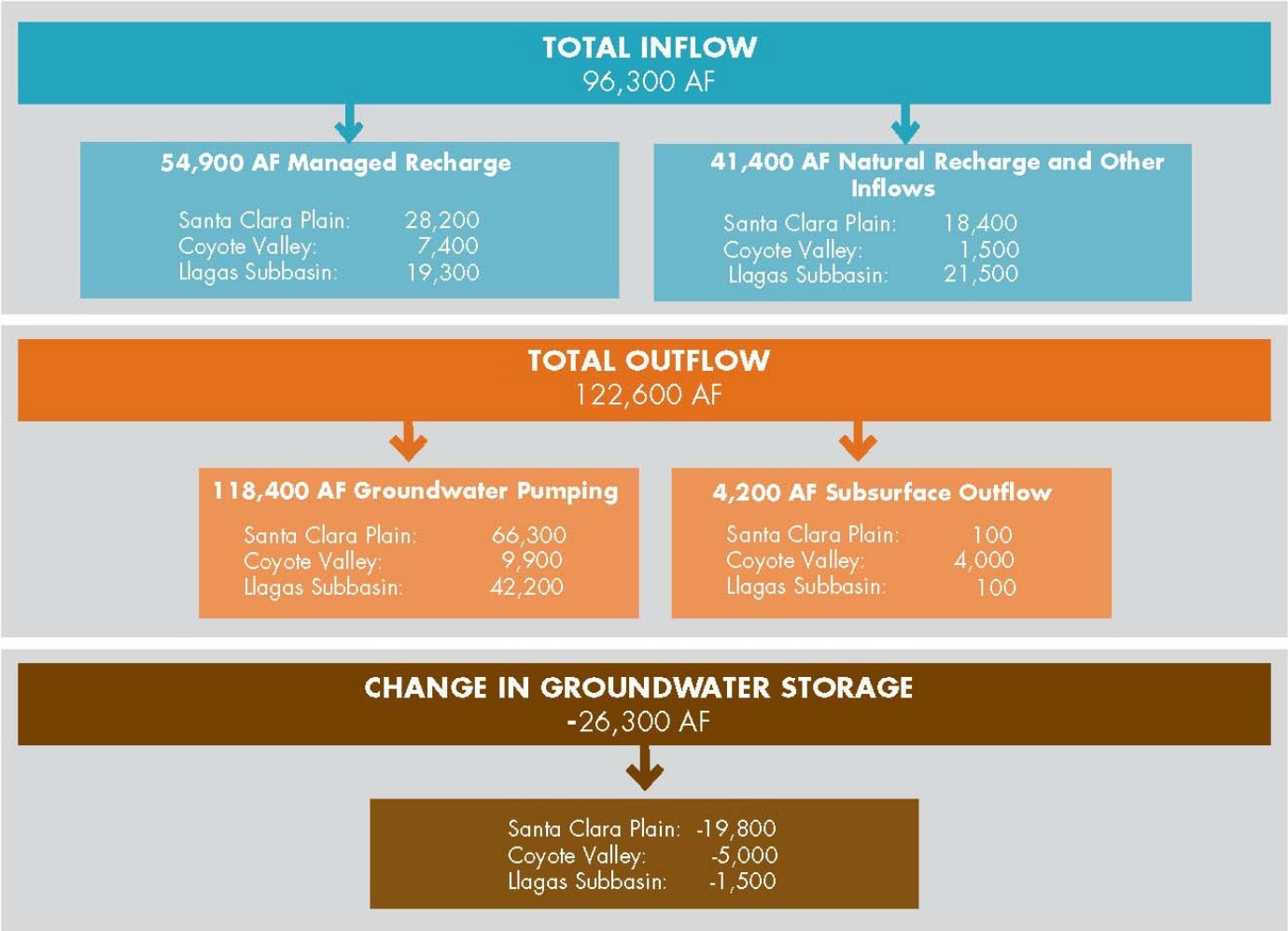
The primary outflow of groundwater is pumping, which accounted for about 97% of the total outflow of 122,600 AF in CY 2015. Subsurface outflow to adjacent aquifer systems was about 4,200 AF, or about 3% of the total outflow.

Change in Storage

Based on the estimated inflows and outflows, there was an estimated decrease in storage of 26,300 AF in CY 2015 due to ongoing dry conditions and reduced managed recharge. Storage in the Santa Clara Plain, Coyote Valley, and Llagas Subbasin decreased by about 19,800 AF, 5,000 AF, and 1,500 AF, respectively.

Remainder of Page Intentionally Left Blank

Figure 12 CY 2015 Groundwater Balance



Notes:

1) Groundwater balance terms presented are estimates as of March 2016, and are refined as additional data becomes available. Values shown are based on measured quantities or calibrated groundwater flow models, with all values rounded to the nearest 100 AF.
2) Managed recharge represents direct replenishment by the District using local and imported water. Estimates from the groundwater models may differ slightly from surface water accounting estimates.
3) Natural recharge and other inflows include the deep percolation of rainfall, septic system and/or irrigation return flows, natural seepage through creeks, and inflow from adjacent aquifer systems.
4) The groundwater pumping estimate is based on pumping measured by the District or reported by water supply well owners.
5) Subsurface outflow represents outflow to adjacent aquifer systems. In the Santa Clara Plain, this includes outflows to San Francisco Bay. In Coyote Valley, this includes outflow to the Santa Clara Plain, and in the Llagas Subbasin, this includes outflows to the Bolsa Subbasin in San Benito County.

3. Groundwater Levels and Storage

The District collected monthly water level measurements from 220 wells in CY 2015, and also evaluated water levels from 110 wells measured by water retailers. Groundwater levels at regional groundwater level index wells were generally higher than 2014 in the Santa Clara Plain and Coyote Valley due to improved rainfall; however, water levels were slightly lower in the Llagas Subbasin. Estimated end of year groundwater storage decreased by 26,300 AF from between 2014 and 2015 mainly due to limited managed recharge in the Santa Clara Plain. The GWMP storage target was not met for all three groundwater management areas in CY 2015 and the projected end of year storage for CY 2016 is below the 300,000 AF target. In accordance with the Water Shortage Contingency Plan, the District set a 30% water use reduction target in March 2015. Countywide, water retailers achieved a water use reduction of 27% in CY 2015 when compared to CY 2013. Groundwater reserves decreased in CY 2015, but much less than in CY 2014.

3.1 Groundwater Levels

Comprehensive and accurate monitoring data allows the District to evaluate groundwater level and storage conditions to support operational decisions and water supply planning efforts. The District measured depth to water data from 220 wells on a daily or monthly basis as shown in Figure 13. The District also evaluated water levels from 110 water supply wells measured by water retailers. As the designated monitoring entity for Santa Clara County under the California Statewide Groundwater Elevation Monitoring (CASGEM) program, the District uploaded almost 1,100 groundwater elevation measurements to the CASGEM website in CY 2015.

Three groundwater level index wells are used to represent regional groundwater elevations in the Santa Clara Plain, Coyote Valley, and the Llagas Subbasin (Figure 14). Table 5 shows March and October groundwater elevations for the index wells, which typically represent the seasonal high and low groundwater elevations, respectively. Due to improved rainfall, average groundwater elevations were 8 feet higher than the previous year in the Santa Clara Plain, 2 feet higher in Coyote Valley and 4 feet lower in the Llagas Subbasin. Groundwater elevations remained above the historically observed minimums and levels seen during the last major drought of 1987-1992 (Figure 13). Groundwater elevations were also above the thresholds established to minimize the risk of land subsidence in all 10 subsidence index wells throughout 2015 (see Section 4).

In the Santa Clara Subbasin, groundwater elevations are highest in the Coyote Valley and the recharge areas of the Santa Clara Plain. Groundwater elevations generally decrease within the interior, confined area of the subbasin, and the general groundwater flow direction is northwest toward San Francisco Bay (Figure 15). The District's managed recharge helps maintain adequate pressure in the principal aquifer zone such that groundwater flows toward the bay and maintains an upward vertical gradient near the bay. The upward gradient minimizes the potential for saltwater intrusion into the principal aquifers.

Groundwater elevation contours for the principal aquifer zone in March and October of 2015 are shown in Figures 15 and 16, respectively. The typical seasonal pattern is higher groundwater levels in the spring and lower levels in the fall due to increased pumping and less natural recharge in the summer and fall. However, this was not observed in CY 2015 because water savings increased as the year progressed and pumping was reduced in the summer months, which is atypical. Groundwater levels in the central portion of the Santa Clara Plain increased between spring and fall due to drought response; groundwater pumping was significantly reduced and there was increased managed recharge compared to the previous year. The October 2015 contours indicate that groundwater elevations in the interior of the Santa Clara Plain have recovered significantly as compared to October 2014.

Table 5 Groundwater Elevations at Regional Index Wells (feet above mean sea level)

Groundwater Subbasin/Area	Index Well	March 2015	October 2015	2015 Average	2014 Average	5 Year Average (2010-2014)	Period of Record Average
Santa Clara Subbasin, Santa Clara Plain	07S01W25L001	40.4	60	49.8	41.3	64.4	8.0
Santa Clara Subbasin, Coyote Valley	09S02E02J002	265.0	251.1	259.3	257.7	264.4	264.3
Llagas Subbasin	10S03E13D003	197.9	178.2	188.9	193.2	220.1	219.0

Note: The period of record for the index wells is 1936-2015 for the Santa Clara Plain, 1948-2015 for the Coyote Valley, and 1969-2015 for the Llagas Subbasin.

The groundwater flow patterns observed in Coyote Valley were similar to those observed in the past, with groundwater flow generally toward the northwest. The highest groundwater elevations in the Llagas Subbasin are in the recharge area in Morgan Hill, and groundwater generally flows southeast toward the Pajaro River and San Benito County. Managed and natural recharge within the recharge area maintains groundwater pressures within the confined area, where groundwater exists in partially to fully confined conditions.

3.2 Groundwater Storage

Estimated groundwater storage at the end of 2015 was below the GWMP outcome measure of 300,000 AF, and 26,300 AF lower than at the end of 2014 (Table 6). End of year groundwater storage of less than 300,000 AF indicates a potential for water shortages in the next year, per the District's Water Shortage Contingency Plan. Due to ongoing dry conditions, the projected end of year storage for 2016 is well below the 300,000 AF target. The District Board maintained the 30% water use reduction target through June 2016, when the target was reduced to 20% in light of improved water supplies.

Table 6 Estimated End of Year Groundwater Storage (AF)

Groundwater Subbasin/Area	GWMP Outcome Measure	End of Year 2014	End of Year 2015	Change in Storage
Santa Clara Subbasin Santa Clara Plain	278,000	234,600	214,800	-19,800
Santa Clara Subbasin Coyote Valley	5,000	5,400	400	-5,000
Llagas Subbasin	17,000	15,400	13,900	-1,500
Total	**300,000**	**255,400**	**229,100**	**-26,300**

Note: Groundwater storage estimates presented are as of March 2016. These estimates are based on accumulated groundwater storage since 1970, 1991, and 1990 for the Santa Clara Plain, Coyote Valley, and Llagas Subbasin, respectively. These estimates are refined as additional pumping and managed recharge data become available.

Figure 13 CY 2015 Groundwater Level Monitoring

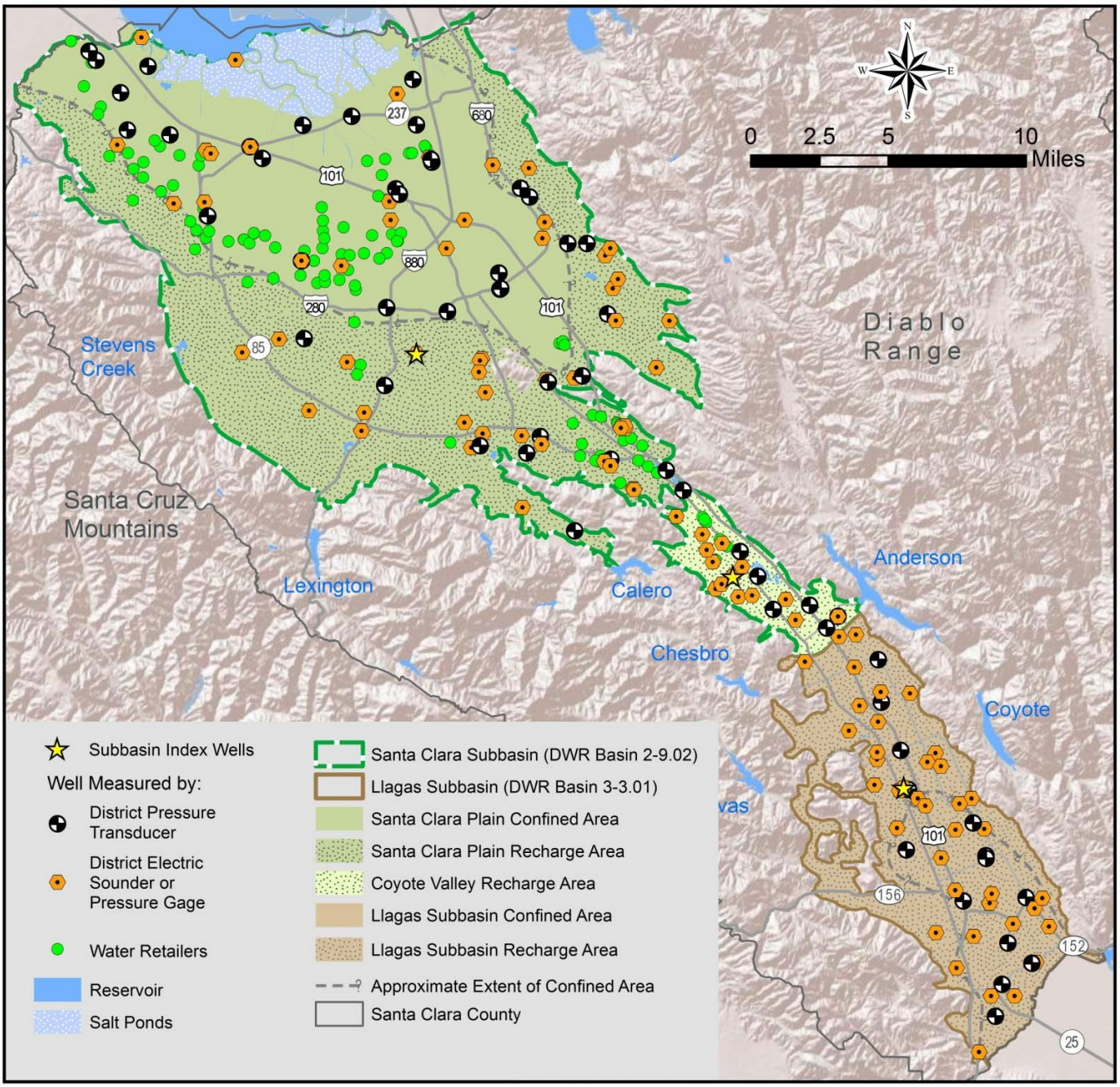
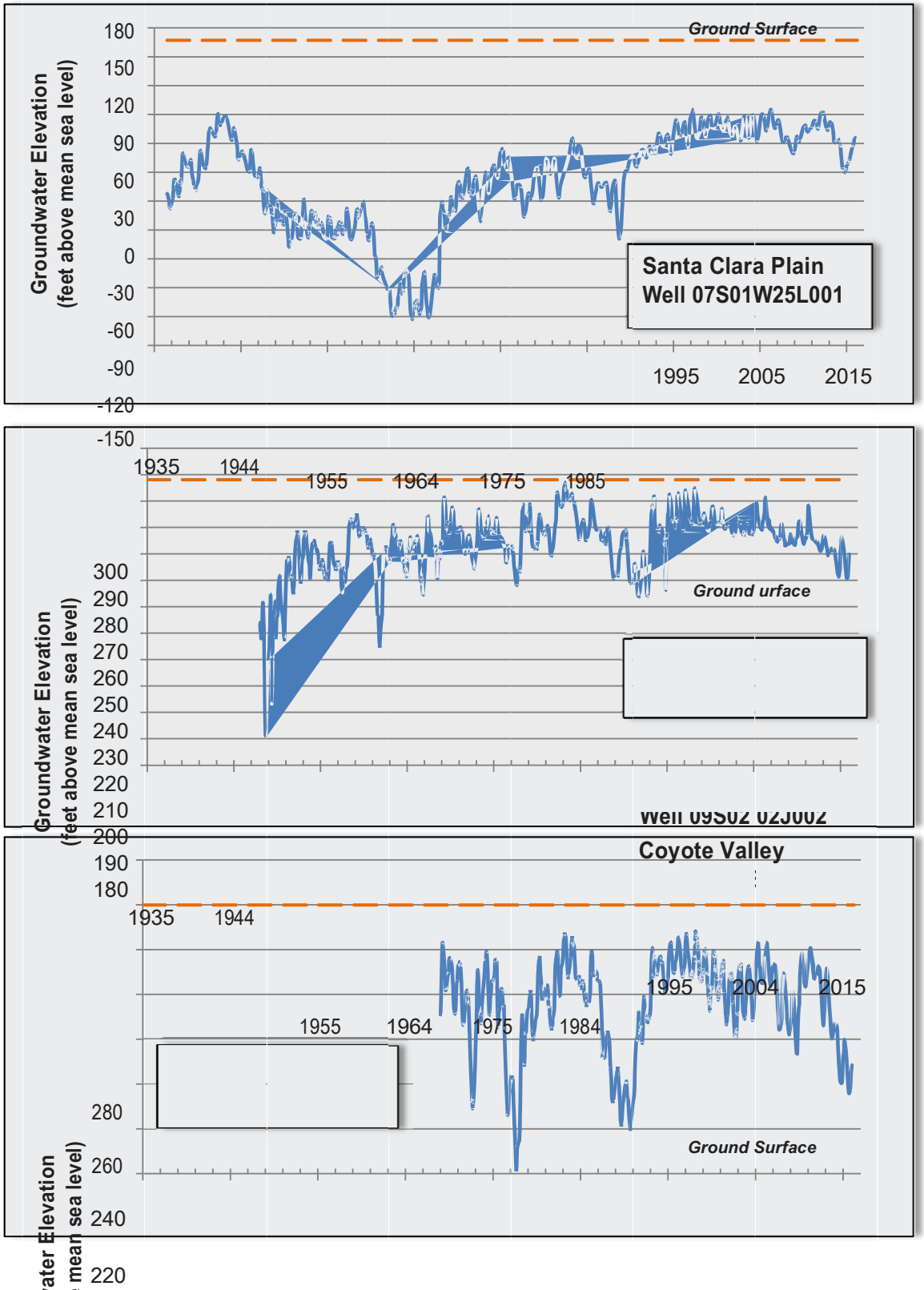


Figure 14 Groundwater Elevations at Regional Index Wells



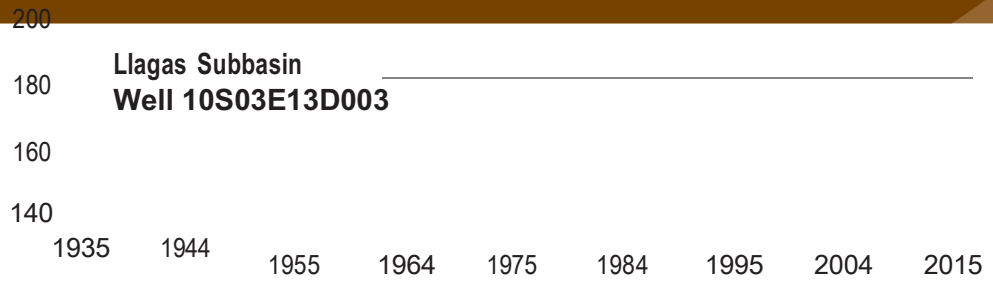

200
180
160
140
Llagas Subbasin
Well 10S03E13D003
1935
1944
1955
1964
1975
1984
1995
2004
2015

Figure 15 Spring 2015 Groundwater Elevation Contours

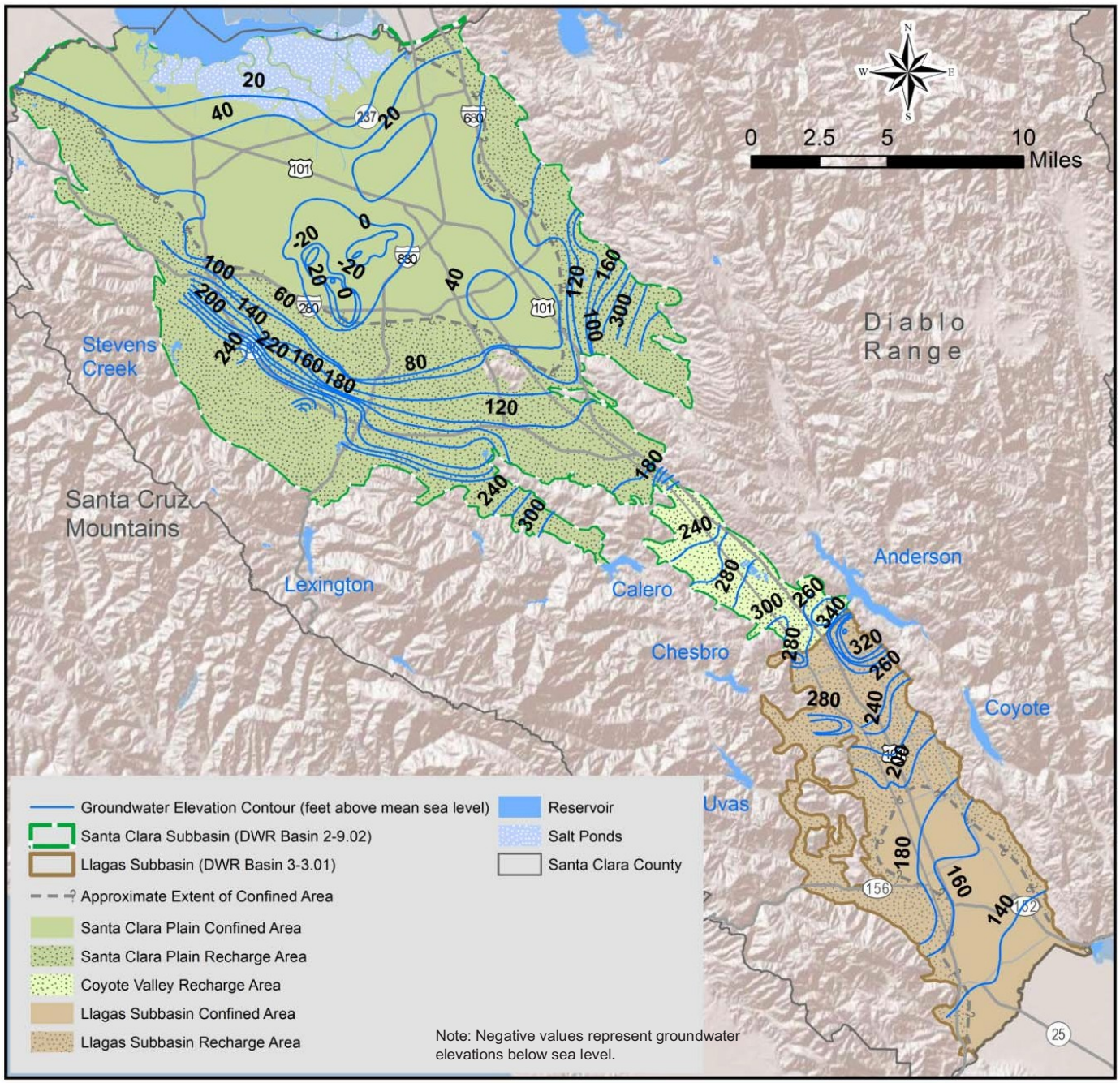
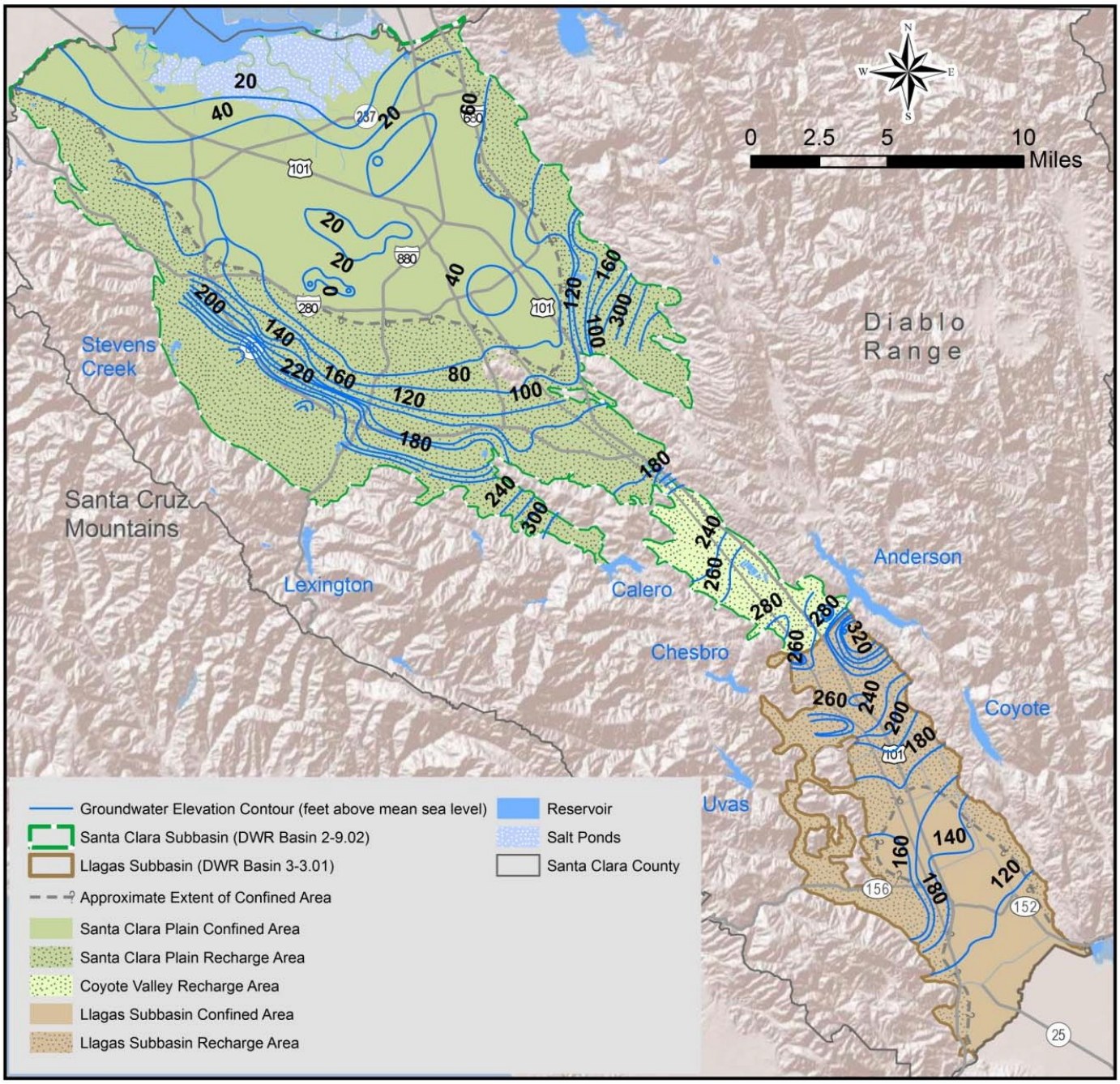


Figure 16 Fall 2015 Groundwater Elevation Contours



Groundwater Storage Outcome Measures

OM 2.1.1.a.
Greater than 278,000 AF of projected end of year groundwater storage in the Santa Clara Plain.

OM 2.1.1.b
Greater than 5,000 AF of projected end of year groundwater storage in the Coyote Valley.

OM 2.1.1.c.
Greater than 17,000 AF of projected end of year groundwater storage in the Llagas Subbasin.

The outcome measures for the Santa Clara Plain, Coyote Valley and Llagas Subbasin were not met in 2015, with an estimated end of year storage of 214,800 AF, 400 AF, and 13,900 AF, respectively. Based on the significant storage decline since 2013 and ongoing drought conditions, it is likely that the storage targets for all three groundwater areas will not be met in 2016.

4. LAND SUBSIDENCE

In CY 2015, the District measured subsidence at 145 benchmarks along three cross valley level circuits and two extensometers. Water levels at ten subsidence index wells were also monitored and compared to thresholds established to minimize the risk of permanent land subsidence. In CY 2015, all subsidence outcome measures were met.

The Santa Clara Plain is vulnerable to land subsidence with about 13 feet of inelastic (permanent) land subsidence observed in San Jose between 1915 and 1969 due to groundwater overdraft. Significant inelastic subsidence was essentially halted by about 1970 through the District's expanded conjunctive management programs, which allowed artesian heads to recover. A minor amount of elastic subsidence and recovery occurs annually in response to seasonal pumping and recharge as indicated by extensometer measurements, benchmark surveys, and Interferometric Synthetic Aperture Radar (InSAR)[7] data. To avoid resumption of permanent inelastic subsidence, the District has established subsidence thresholds at ten index wells in the Santa Clara Plain[8]. A tolerable rate of 0.01 feet per year of subsidence[9] was used to determine thresholds at these wells. These subsidence thresholds are the groundwater levels that must be maintained to ensure a low risk of land subsidence.

The District conducts ongoing monitoring of benchmarks on the land surface, extensometers, and groundwater levels at subsidence index wells to determine if land subsidence is occurring or threatening to exceed established thresholds. Subsidence monitoring points are shown in Figure 17. Monitoring data in 2015 from extensometers, benchmark surveys, and subsidence index wells indicates a low risk of subsidence, as described further below.

4.1 Extensometer Monitoring

The District monitors two 1,000-foot deep extensometers that measure vertical ground motion (or aquifer compaction) relative to a central, isolated pipe set beneath the water bearing units. The extensometers are located in Sunnyvale near Moffett Field ("Sunny") and near downtown San Jose ("Martha"), and are equipped with data loggers to provide hourly readings of aquifer compaction and water level. The District evaluates the average land subsidence measured during the last 11 years to determine if it meets the tolerable rate of land subsidence of 0.01 feet/year.

Figure 18 shows cumulative compaction measured at the extensometers for the period of record supplemented with nearby benchmark data. These figures indicate that land subsidence conditions over the last few decades have been relatively stable. The figures also show close correlations between the District's land subsidence model, which is used to forecast land subsidence, and actual measured data. Measured data show a negative compaction (i.e., aquifer expansion) at both sites in 2015. The average subsidence rate over the last 11 years (2005 to 2015) is 0.005 feet/year, which is below the tolerable subsidence rate of 0.01 feet/year. The average for the previous period (2004 to 2014) was 0.008 feet/year. The decreased average subsidence rate results from groundwater level recovery in 2015. Measured compaction is within the elastic range observed historically, but vigilant land subsidence monitoring and analysis are critical as the drought continues.

---

[7] Schmidt, D.A. and Burgmann, R., Time-Dependent Land Uplift and Subsidence in the Santa Clara Valley, California from a Large Interferometric Synthetic Aperture Radar Data Set, Journal of Geophysical Research, Volume 108, No. B9, 2003.

[8] Geoscience Support Services Inc. for Santa Clara Valley Water District, Subsidence Thresholds in the North County Area of Santa Clara Valley, 1991.

[9] The tolerable subsidence rate of no more than 0.01 feet per year on average was endorsed by the District's Water Retailer

Groundwater Subcommittee.

Figure 17 CY 2015 Land Subsidence Monitoring

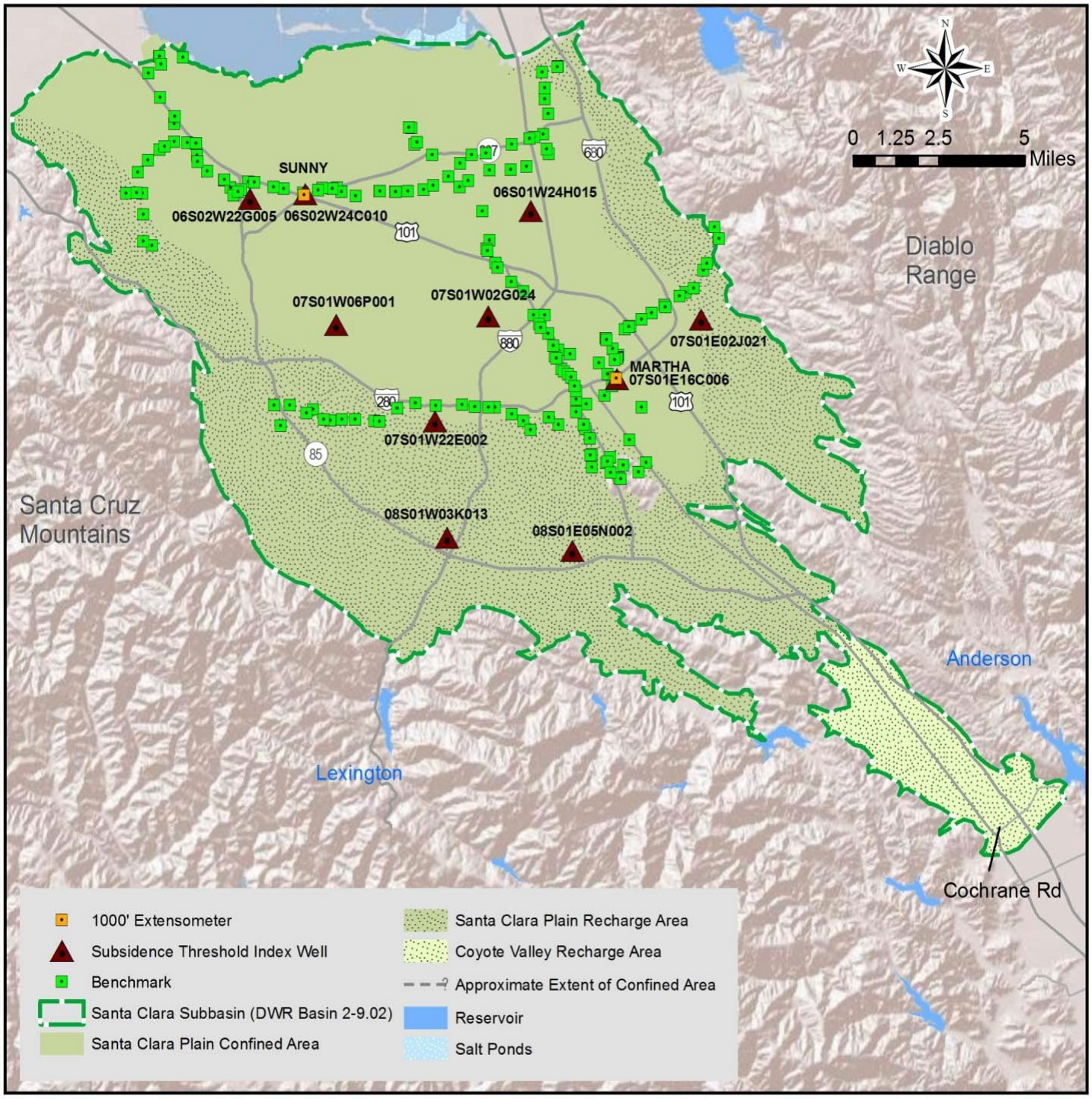
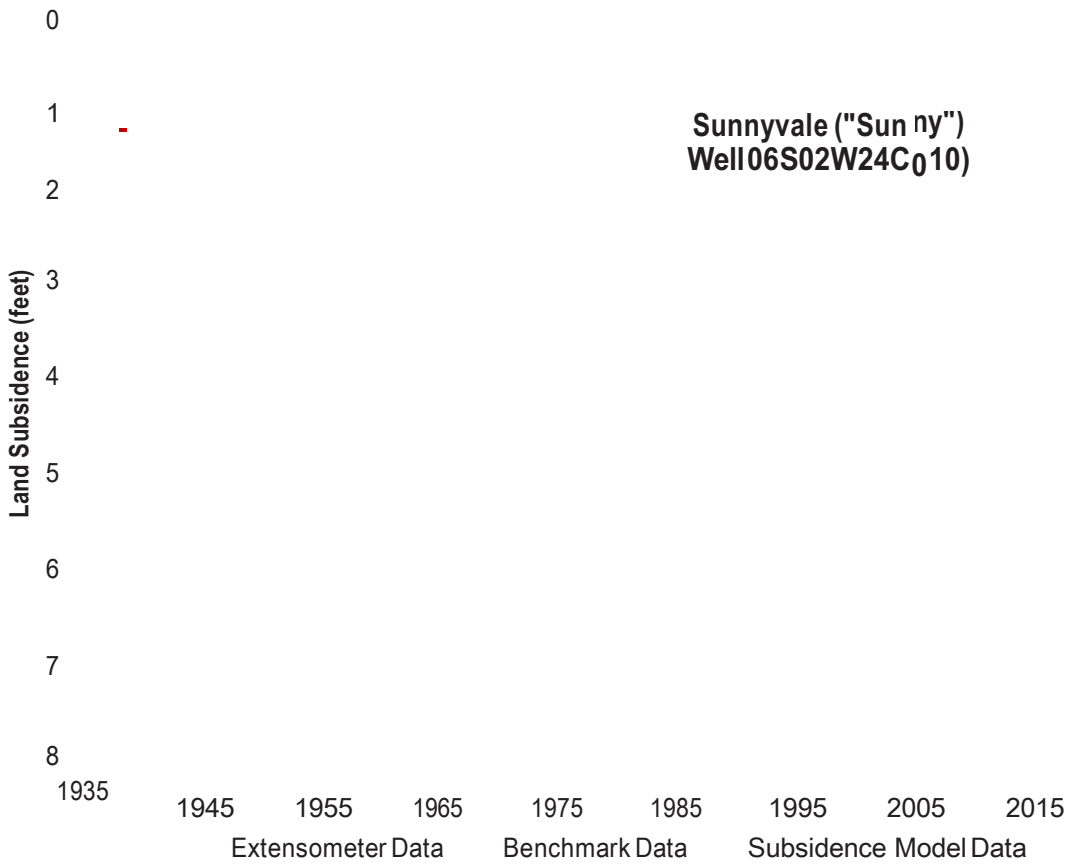
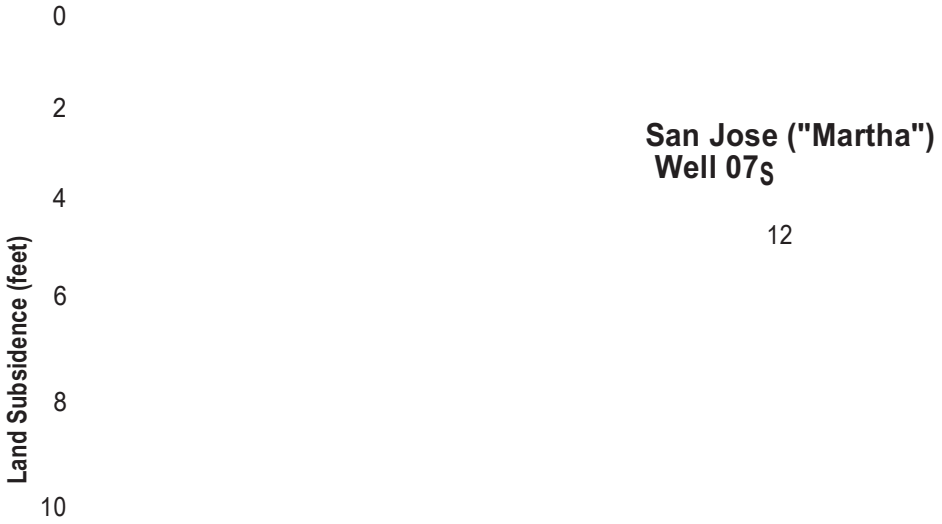
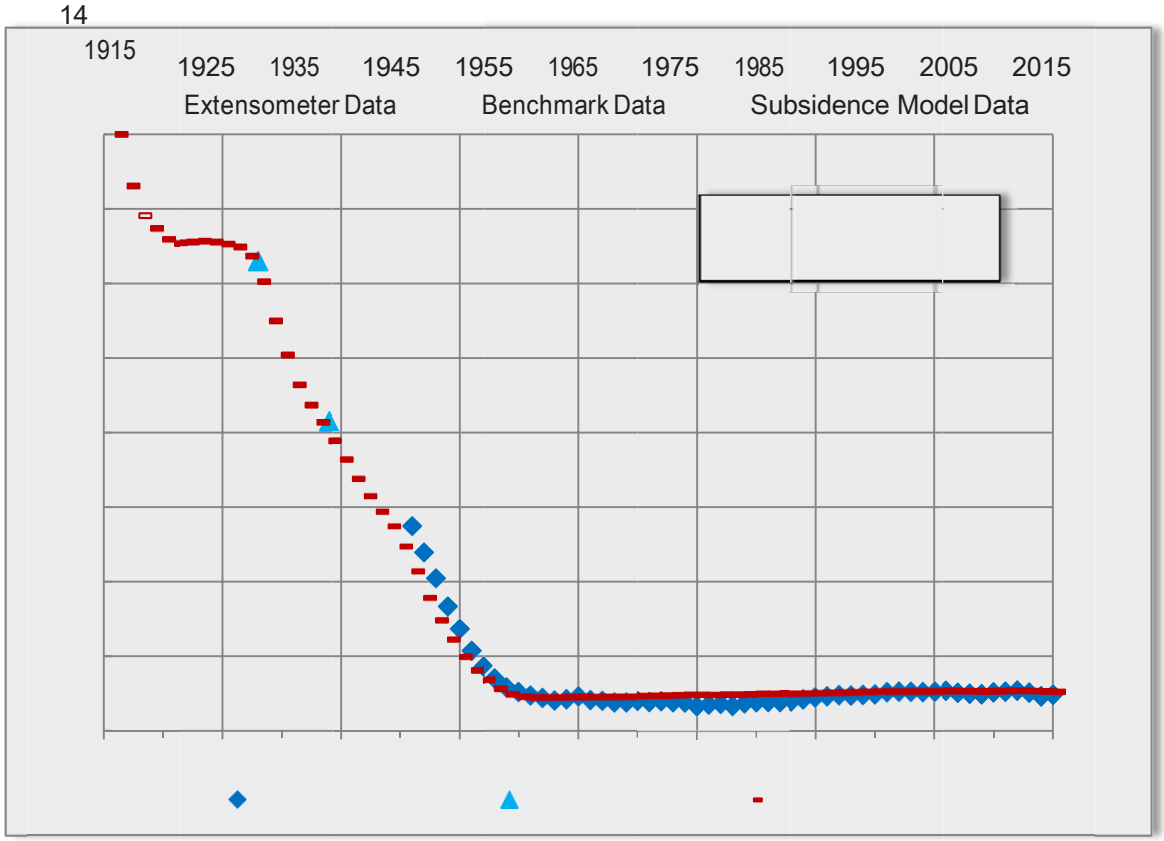


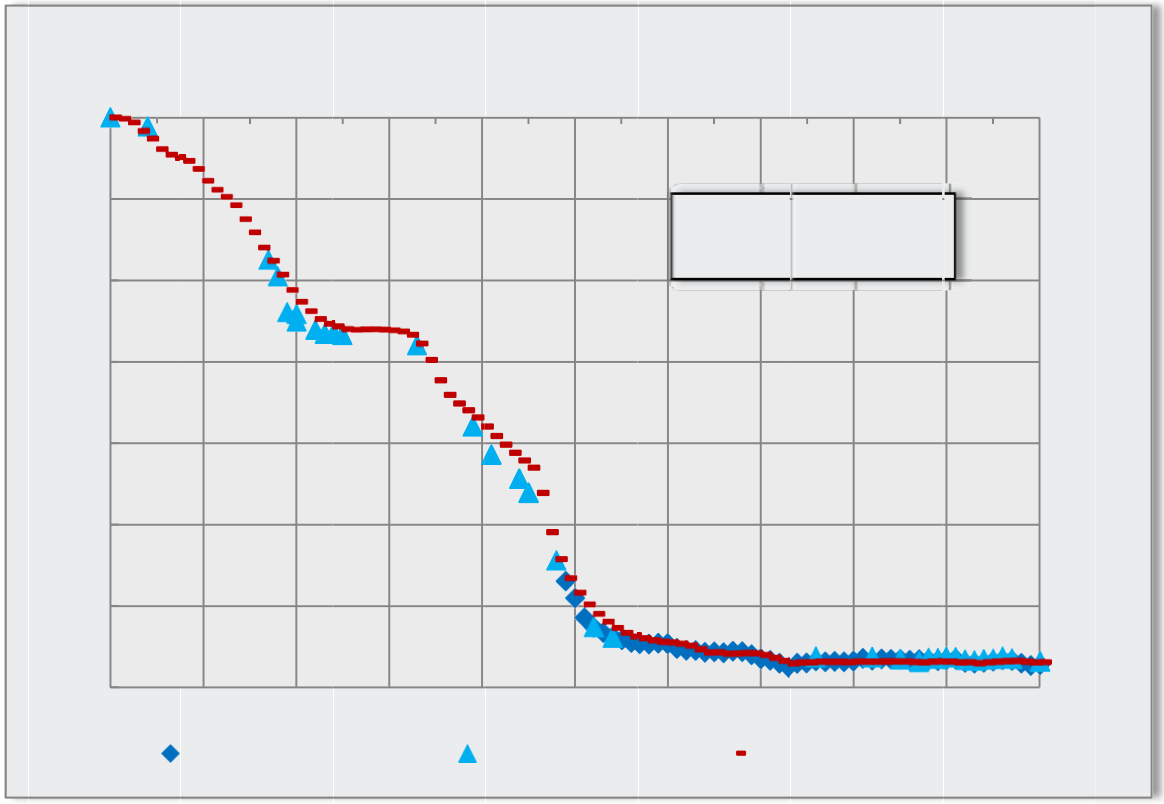
Figure 18 Cumulative Land Subsidence





01E16C006


14
1915
1925
1935
1945
1955
1965
1975
1985
1995
2005
2015
Extensometer Data
Benchmark Data
Subsidence Model Data



4.2 Benchmark Elevation Surveys

Periodic benchmark surveys of land surface elevation have been conducted in Santa Clara County since 1912[10]. The District's current benchmark leveling program consists of annual surveys along three cross valley level circuits in the Santa Clara Plain. In 2015, the District analyzed land surface elevation data from 145 benchmarks to evaluate the spatial variability of land subsidence. Survey data at a majority of benchmarks show the land surface rising in 2015 due to significantly decreased pumping and increased recharge. Regional benchmark data is consistent with extensometer data, indicating the average annual change of land surface over the last 11 years does not exceed the tolerable rate of subsidence of 0.01 feet per year.

4.3 Subsidence Index Wells

Groundwater level measurements are an integral part of land subsidence monitoring because declining water levels due to long-term overdraft were the driving force of historical subsidence in the Santa Clara Plain. The District measures water levels at ten subsidence index wells on a daily to monthly basis to ensure they remain above established thresholds. If water levels drop below subsidence thresholds for extended periods, permanent land subsidence may resume, resulting in an increased risk of flooding, salt water intrusion, and damage to infrastructure and utilities.

Figure 19 shows groundwater levels and subsidence thresholds at ten subsidence index wells. The lowest historical water levels were generally observed in the 1960s and 1970s. Since then, groundwater levels have recovered, primarily due to the District's managed recharge and in-lieu recharge programs. In general, groundwater levels in 2015 were in recovery from water level declines in the previous year. End of 2015 water levels improved in 9 of 10 subsidence index wells and they slightly declined in one well. Three subsidence index wells located near the Baylands continue to have upward vertical gradients. In addition to keeping water levels above subsidence thresholds, maintaining an upward hydraulic gradient in principal aquifer zone wells is critical for preventing shallow groundwater with elevated TDS from entering the principal aquifer through abandoned wells and other vertical conduits. In 2015, both conditions were met at those wells. The District will continue to frequently track data from the subsidence index wells to support water supply operations and planning.

Remainder of Page Intentionally Left Blank

[10] USGS, Land Subsidence in the Santa Clara Valley, California as of 1982, Professional Paper 497-F, 1988.

Figure 19 Groundwater Levels at Subsidence Index Wells (feet above mean sea level)

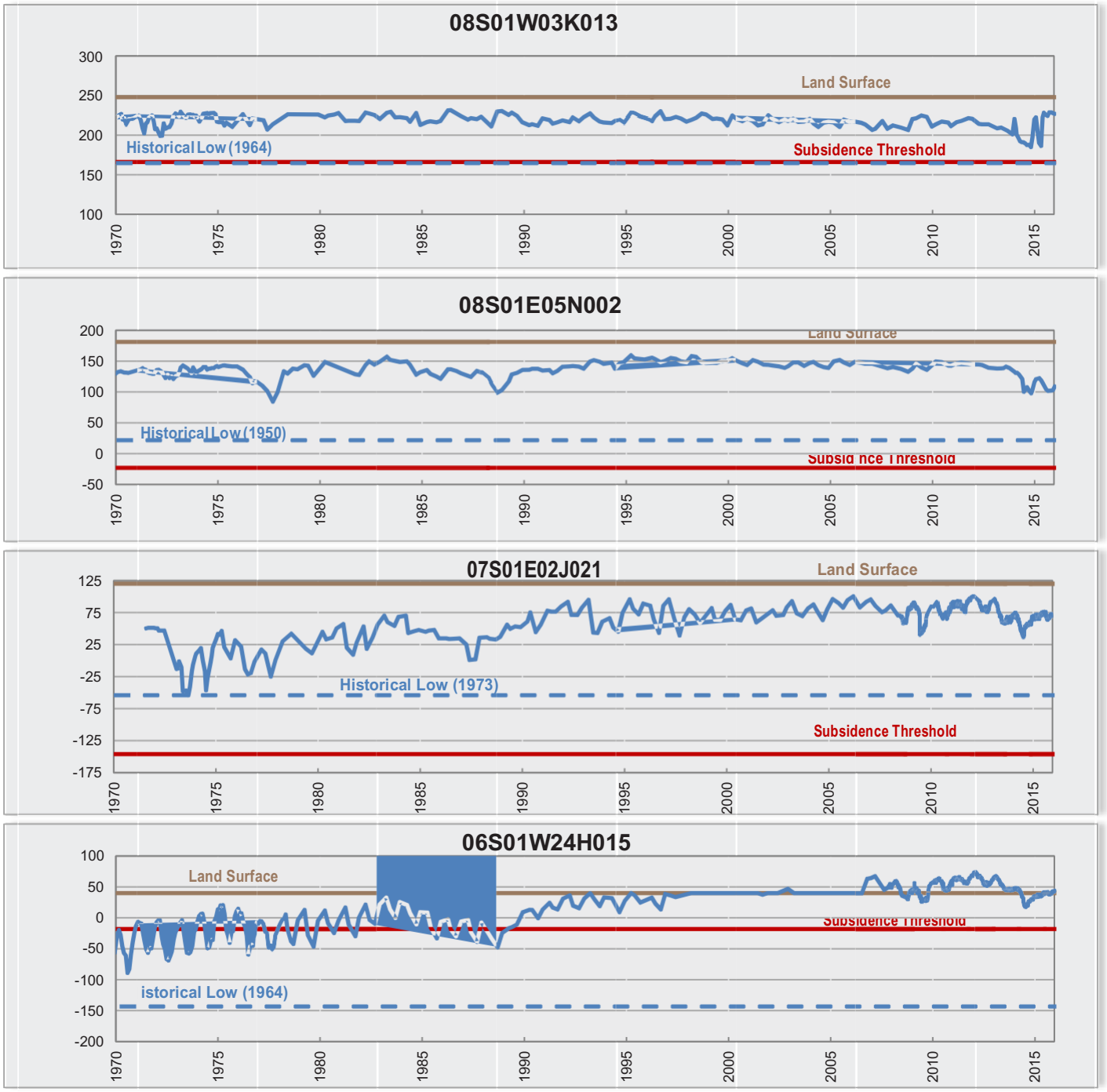


Figure 19 Groundwater Levels at Subsidence Index Wells (feet above mean sea level, continued)

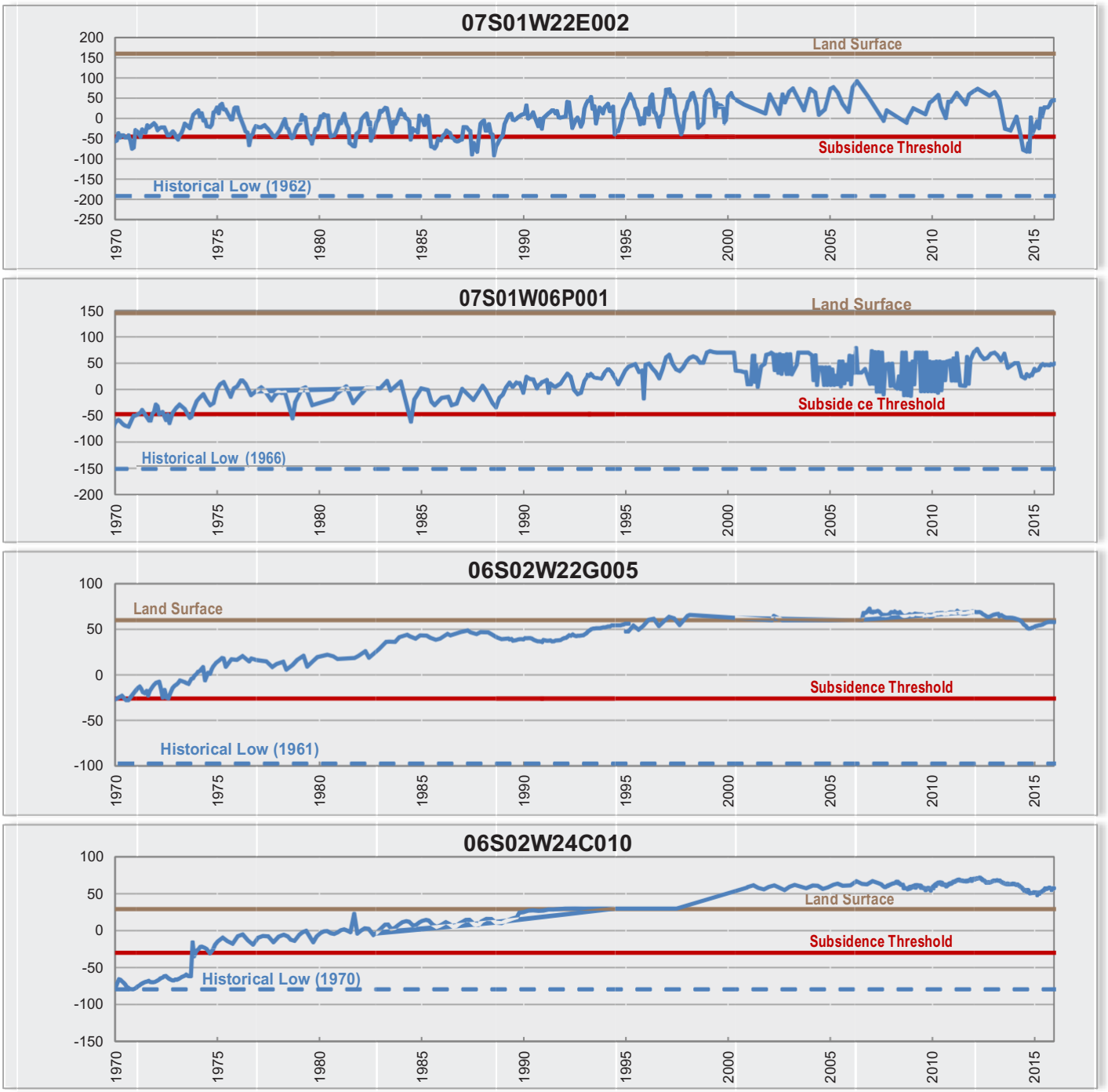
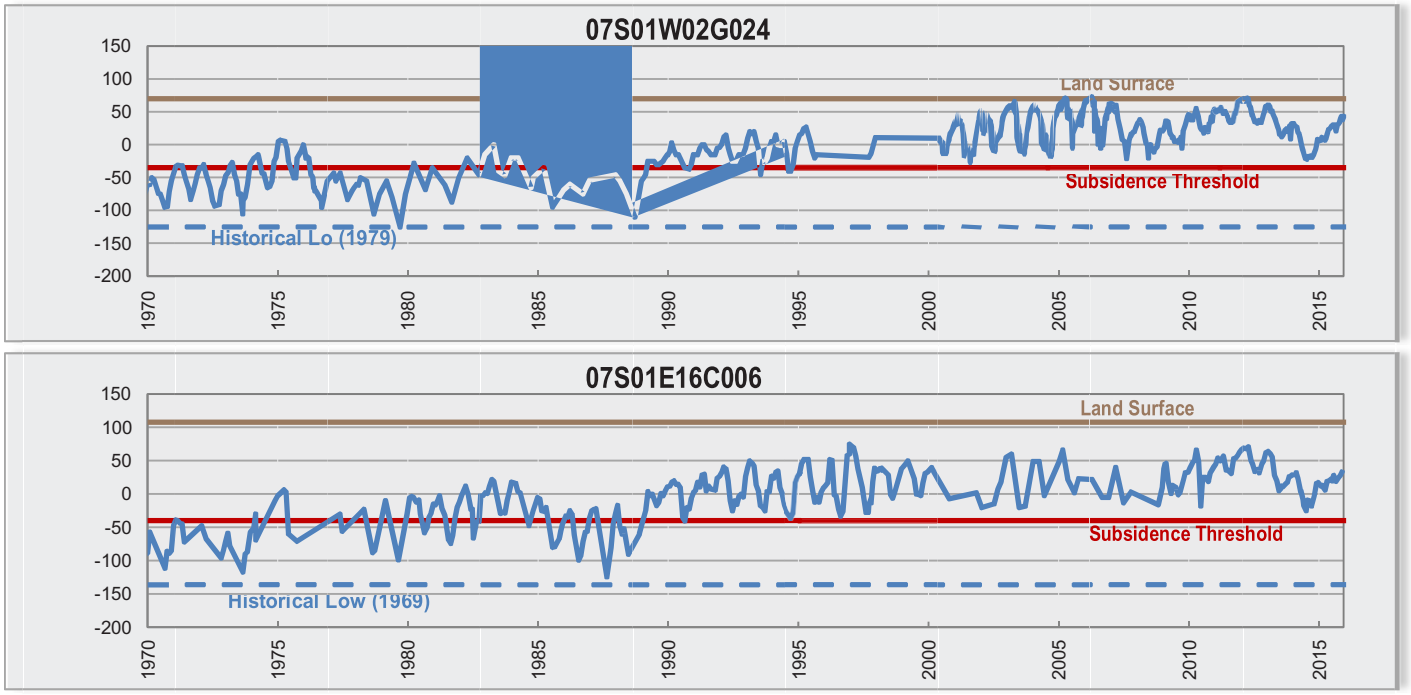


Figure 19 Groundwater Levels at Subsidence Index Wells (feet above mean sea level, continued)



Land Subsidence Outcome Measure

OM 2.1.1.d.
100% of subsidence index wells with groundwat r levels abo e subsidence thresholds.

The outcome measure is met for calendar year 5 asgroundwater levels ere above subsidence thresholds at all ten Santa Clara Plain su sidence index wells.

5. GROUNDWATER QUALITY

In CY 2015, the District tested groundwater quality at 318 wells, including 87 District monitoring locations, 214 domestic wells, and 17 wells near recycled water irrigation sites. The District also examined groundwater quality data from 225 public water supply wells and monitored recharge water quality at 8 locations.

Groundwater in the Santa Clara and Llagas Subbasins is generally of good quality that meets drinking water standards in most wells for all constituents tested. An exception is nitrate, which is elevated in 23% of South County water supply wells tested in 2015 (primarily domestic wells). Nitrate is present due to current and historic sources and primarily impacts private domestic wells. To address nitrate loading, the District completed Salt and Nutrient Management Plans in 2014 in coordination with basin stakeholders. The District continues to offer free water testing and rebates for nitrate treatment systems for domestic well users to reduce consumer exposure.

Samples were collected in September and December 2015 from the Los Gatos recharge system and the Upper Llagas recharge system. Results indicate recharge water quality continues to be of similar or better quality than groundwater for the parameters tested. Surface water quality indicators measured in CY 2015 were all within the normal range.

Past District groundwater monitoring near a recycled water irrigation study site in the Santa Clara Plain shows increasing trends for salts in some monitoring wells, as well as low-level detections of disinfection byproducts and other constituents. In 2015, recycled water irrigation monitoring wells at the Santa Clara Plain study site could not be sampled because they were dry due to the drought. In the Gilroy recycled water irrigation groundwater monitoring wells, disinfection byproducts are not detected, and salt concentrations are variable with no discernible trend. Perfluorinated compounds, which are also detected in recycled water, have been detected sporadically in several monitoring wells.

The District continues to coordinate with the state and federal agencies managing cleanup of groundwater contamination sites to track progress and issue recommendations for effective remediation measures. The District will continue to track water quality changes and work with stakeholders to identify ways to protect groundwater quality.

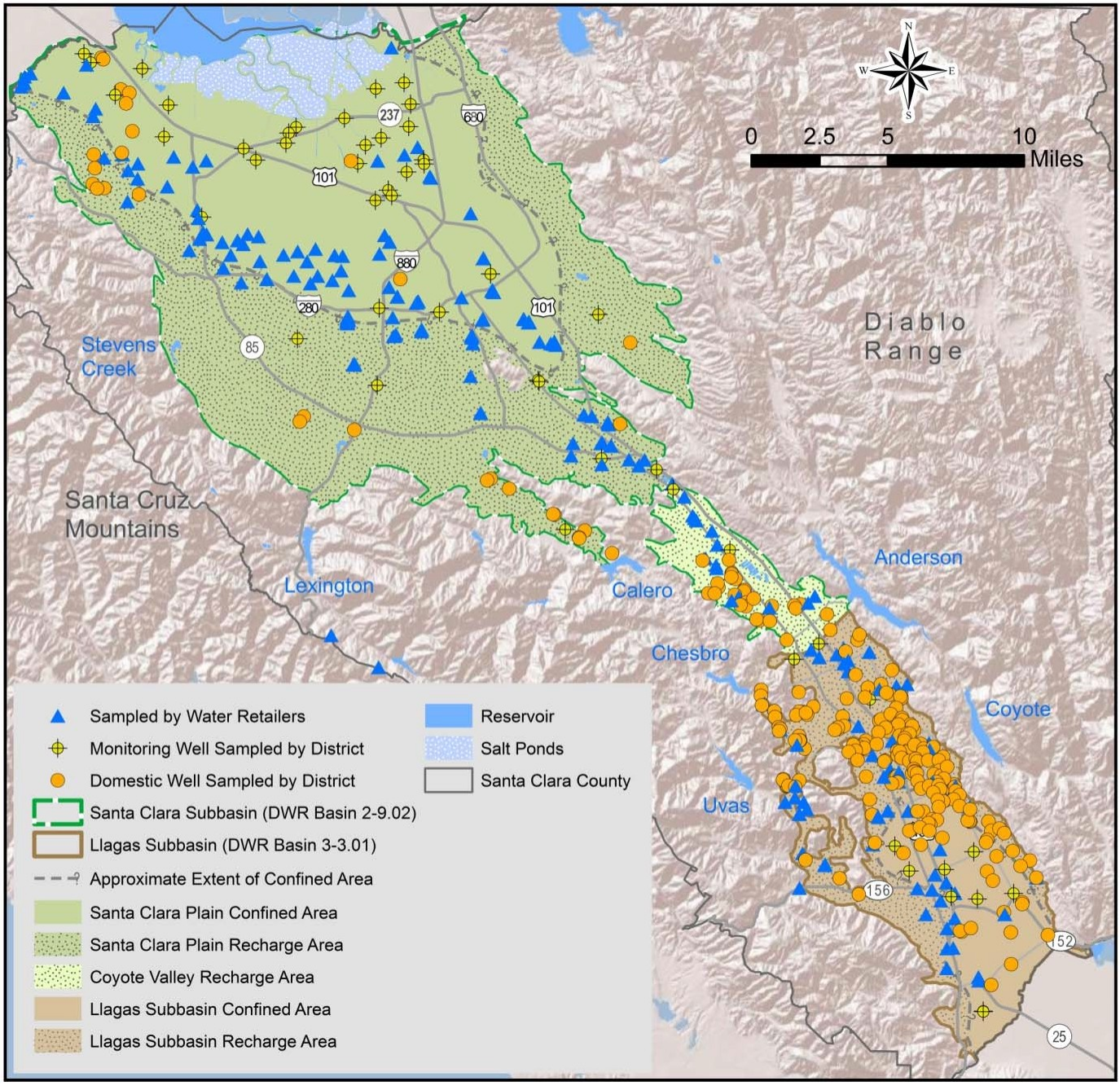
5.1 Regional Groundwater Quality

The District sampled groundwater quality at 87 wells, including 61 monitoring wells and 26 domestic wells, as part of the annual groundwater quality monitoring program (Figure 20)[11]. Seventy samples were analyzed for approximately 50 water quality parameters including major and minor ions, nutrients, and trace metals. Seventeen samples from monitoring wells near the San Francisco Bay were analyzed for 6 water quality parameters for saltwater intrusion monitoring. This report also incorporates data from 53 wells with known construction sampled through the District's domestic well sampling program. The District also evaluated data from 225 public water supply wells sampled by water retailers and reported to the State Water Resources Control Board Division of Drinking Water (DDW)[12].

[11] The District also collected limited water quality data at 214 domestic wells in 2015 as part of the Domestic Well Testing Program. In addition to monitoring well data, data from the 53 domestic wells with available well construction information are summarized in this section, where results are grouped by subbasin and aquifer zone. The results for all domestic wells are summarized in Section 5.3.

[12] Formerly the California Department of Public Health (CDPH).

Figure 20 CY 2015 Groundwater Quality Monitoring Wells



To evaluate regional water quality conditions, the District determined water quality parameter median and range for each subbasin and aquifer zone[13] (Appendix B). Results indicate groundwater in the Santa Clara and Llagas Subbasins is generally of high quality. Water quality indicators, ions, and trace elements were within the normal range expected in groundwater, with the exception of nitrate. Elevated nitrate is primarily an issue in South County due to historic and ongoing sources including synthetic fertilizer, septic systems, and animal enclosures. A few individual volatile organic compounds (VOCs) were detected; however, none were present at concentrations above their respective Maximum Contaminant Levels (MCLs). Seven different pesticide compounds were detected in four wells in the Santa Clara Plain principal aquifer, but none of the pesticides detected have established MCLs. The Coyote Valley and the Llagas Subbasin principal aquifers had no pesticide detections.

Recent sample median concentrations for nitrate and Total Dissolved Solids (TDS) are presented in Table 7. There is no statistically significant change for nitrate or TDS between CY 2014 and CY 2015 for all areas and aquifer zones per the Mann-Whitney Test, using a 95% confidence level. Fluctuations in sample medians are expected due to variation in which wells are tested each year, and amounts of recharge, pumping, and rainfall.

Table 7 Median Nitrate and TDS by Subbasin and Aquifer Zone (mg/L)

Parameter	Santa Clara Subbasin						Llagas Subbasin			
	Santa Clara Plain Shallow Aquifer		Santa Clara Plain Principal Aquifer		Coyote Valley		Shallow Aquifer		Principal Aquifer	
	2015	2014	2015	2014	2015	2014	2015	2014	2015	2014
Nitrate (as NO_3)	9.2	6.4	13	13	23.8	15.2	34	49.2	28.6	20.5
TDS	498	542	400	410	380	370	412	434	371	382

1) The shallow and principal aquifer zones are represented by wells primarily drawing water from depths less than and greater than 150 feet below ground surface, respectively.
2) Nitrate has a health-based MCL of 45 mg/L. TDS has an aesthetic-based MCL, which ranges from 500 to 1,000 mg/L (recommended and upper limit, respectively).
3) Table includes information for monitoring wells, public water supply wells, and domestic wells for which construction information is available. The set of wells sampled each year varies.
4) Median TDS in the Santa Clara Plain Shallow aquifer excludes wells within the region influenced by saltwater interaction.

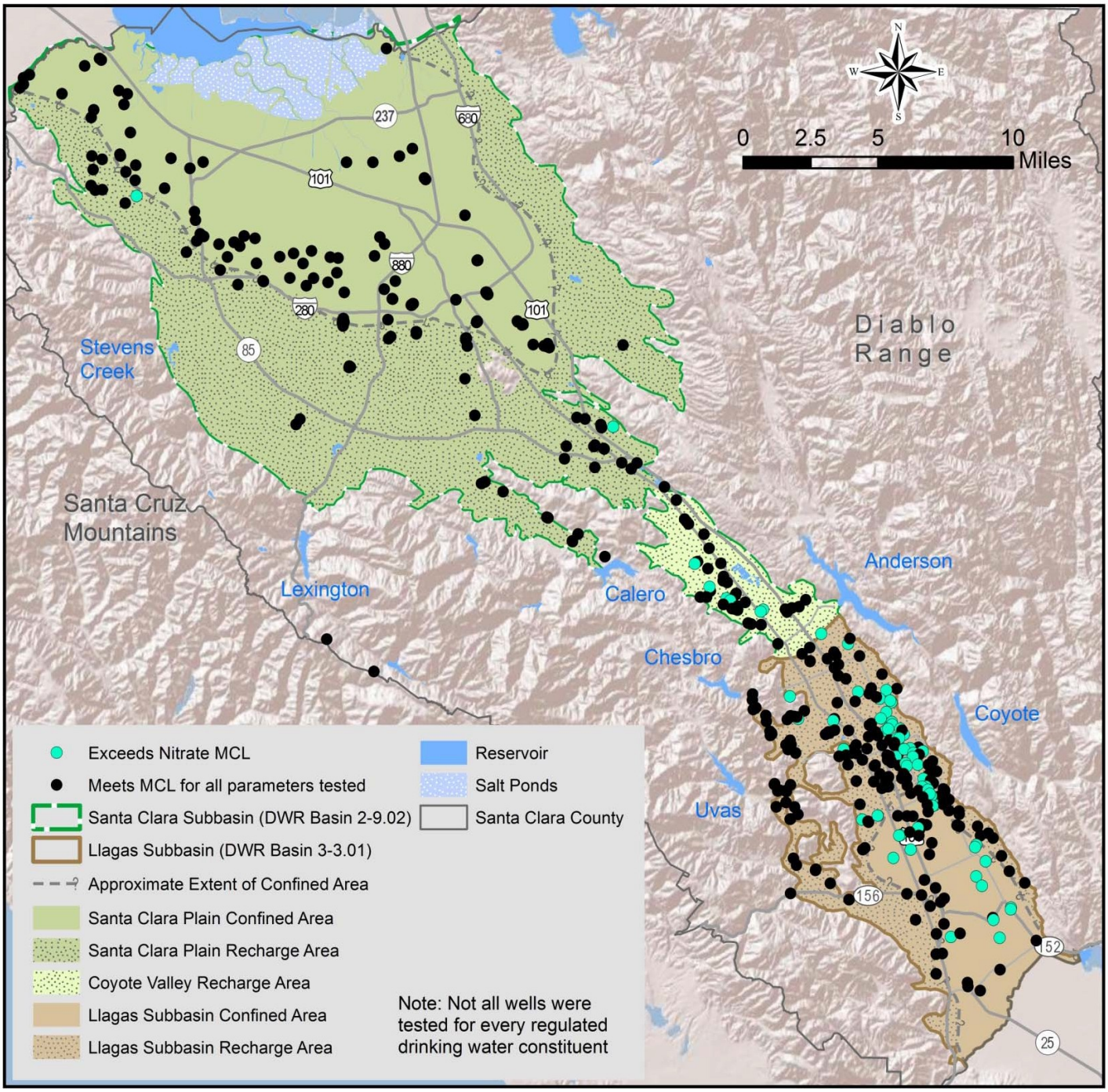
Comparison to Drinking Water Standards

With the exception of nitrate, all water supply wells tested (including public water supply wells and domestic wells) met all MCLs; this drops to 84% if nitrate is included. 23% of South County water supply wells tested exceeded the nitrate MCL of 45 milligrams per liter (mg/L). Figure 21 presents the locations of wells with an MCL exceedance. Most of these detections were from private domestic wells that are not regulated by the state, while 10% (7 wells) were public water systems. Public water systems must comply with drinking water standards, which may require treatment or blending prior to customer delivery. Most domestic well owners contacted whose well water exceeds the nitrate MCL use bottled water for drinking and cooking, or reverse osmosis treatment to remove nitrate.

[13] Public water supply wells were assumed to represent the principal aquifer if no construction information was available as these

are typically deep wells.

Figure 21 CY 2015 Water Supply Well Results With Regards to MCLs



While not used as a source of drinking water, some monitoring wells sampled are screened in the principal aquifer zone. Of these deep monitoring wells, only one had a detection of any constituent above its MCL (nitrate). Ten shallow aquifer zone monitoring wells were also affected by nitrate. With very few exceptions, the shallow aquifer is not directly used as a source of drinking water, although shallow groundwater recharges the principal aquifer in the long term.

Comparison to Agricultural Objectives

South County groundwater quality was evaluated against agricultural water quality objectives from the applicable Regional Water Quality Control Board Basin Plans[14] to assess its suitability for agricultural uses. Because the District has limited access to agricultural wells, water supply well data were used in this evaluation. 98 percent of all South County water supply wells met Basin Plan agricultural objectives. In Coyote Valley, all wells met the objectives except one well each for nitrate and electrical conductivity. In the Llagas Subbasin, four wells did not meet the nitrate objective.

5.2 Groundwater Quality Trends

To assess changes in water quality over time, the District evaluated statistical trends for chloride, nitrate, and TDS concentrations by groundwater management area and aquifer zone. Trend was evaluated for all wells (including water supply and monitoring wells) with at least 5 results over the last fifteen years (2001 through 2015). The results are shown in Figures 22 through 24 and summarized in Table 8, which indicates the majority of wells show a stable or decreasing trend. In general, chloride trends are stable or increasing in the Llagas Subbasin, stable in Coyote Valley, and mixed in the Santa Clara Plain. Potential causes for increasing trends in some shallow zone wells will be evaluated further. Nitrate is generally stable or decreasing throughout the county, and a cluster of wells with decreasing trends is observed in the southern portion of the Santa Clara Plain near the Coyote Valley (Figure 23). This may be the result of dilution from the managed recharge of water with low nitrate content through Coyote Creek. Though less well-defined, another cluster of wells with an upward nitrate trend is observed in the downtown area of San Jose. Only a small percentage of wells had increasing trend for TDS.

Remainder of Page Intentionally Left Blank

[14] Groundwater in the Coyote Valley is compared to the limits in Table 3-6 of the San Francisco Bay Basin Water Quality Control Plan (March 2015). Groundwater in the Llagas Subbasin is compared to the upper range of the “increasing problems” range in

Table 3-3 and Table 3-4 (irrigation supply) of the Water Quality Control Plan for the Central Coast Basin (March 2016).

Table 8 Chloride, Nitrate, and TDS Trends (2001 - 2015)

Groundwater Management Area	Parameter	Number of Wells Evaluated	Percent of Wells with Stable or Decreasing Trend	Number of Wells with Increasing Trend
Santa Clara Plain Shallow Aquifer	Chloride	27	67%	9
	Nitrate (as NO_3)	20	95%	1
	TDS	19	95%	1
Santa Clara Plain Principal Aquifer	Chloride	151	89%	16
	Nitrate (as NO_3)	250	88%	29
	TDS	149	96%	6
Coyote Valley	Chloride	18	100%	0
	Nitrate (as NO_3)	32	88%	4
	TDS	20	85%	3
Llagas Subbasin Shallow Aquifer	Chloride	22	55%	10
	Nitrate (as NO_3)	225	98%	5
	TDS	22	73%	6
Llagas Subbasin Principal Aquifer	Chloride	53	85%	8
	Nitrate (as NO_3)	110	95%	6
	TDS	52	98%	1
All Groundwater Management Areas	Chloride	271	84%	43
	Nitrate (as NO_3)	637	93%	45
	TDS	262	94%	17

Figure 22 Chloride Trends (2001 - 2015)

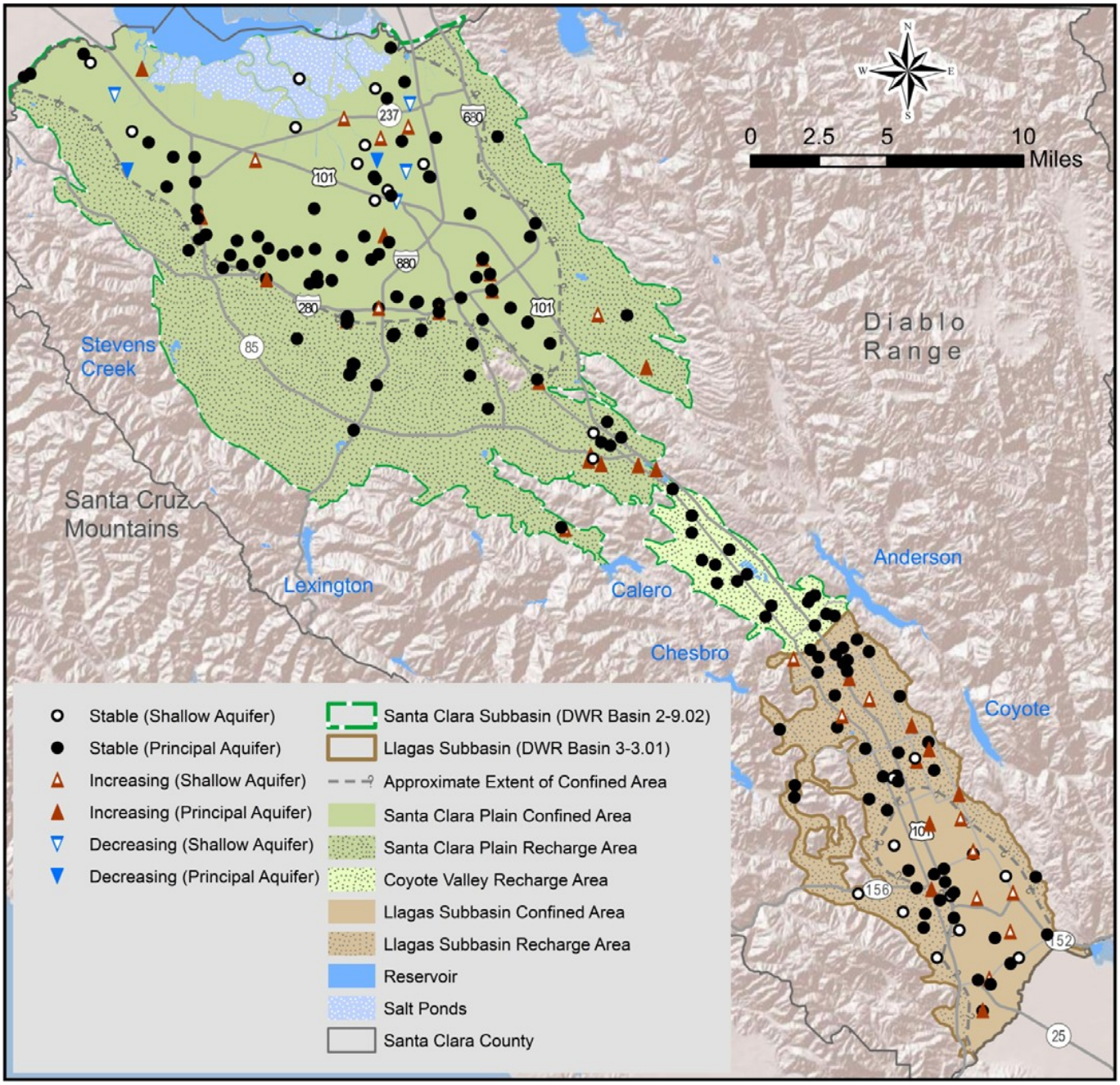


Figure 23 Nitrate Trends (2001 - 2015)

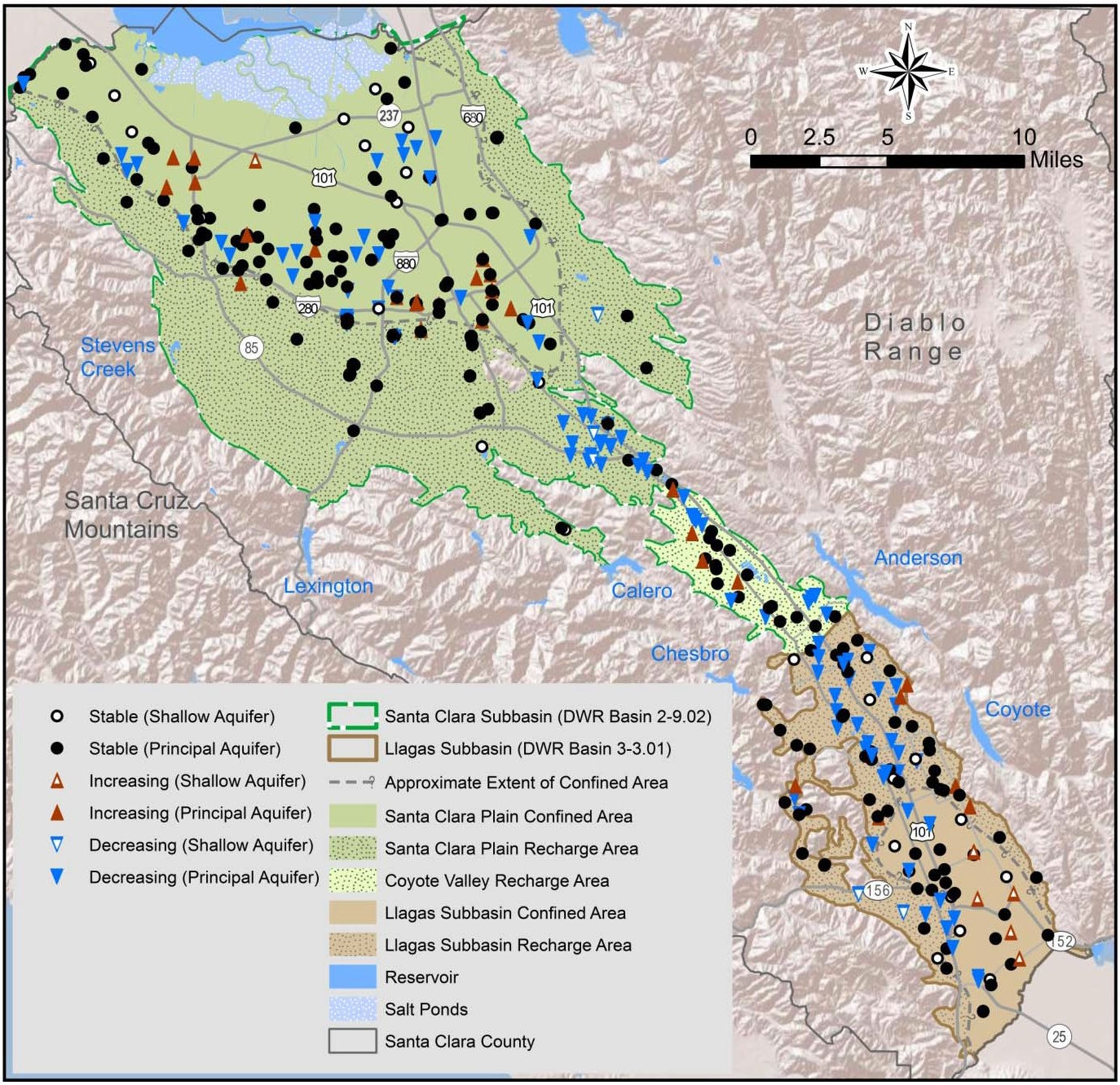
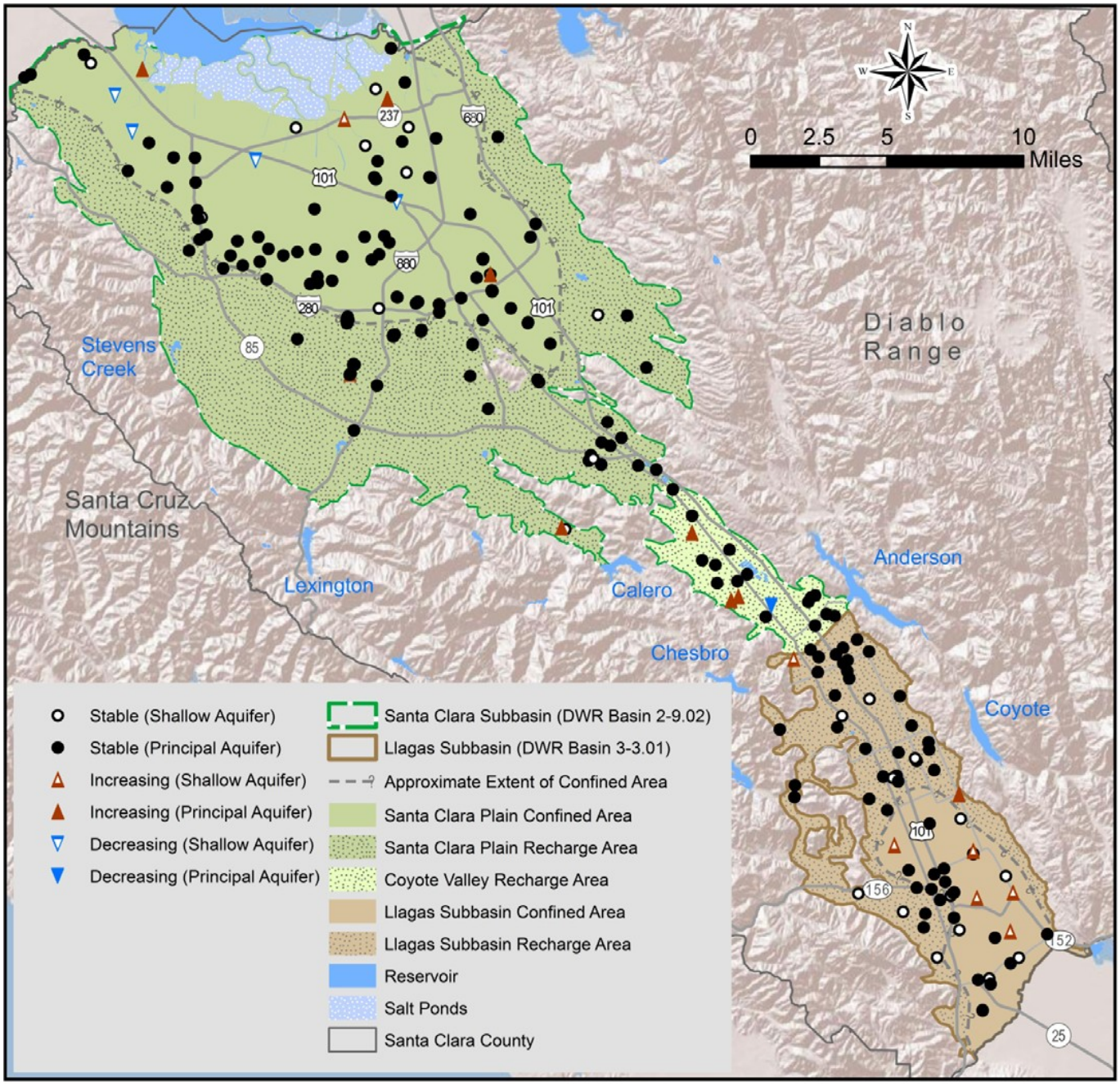


Figure 24 Total Dissolved Solids (TDS) Trends (2001 - 2015)



Groundwater and Salt Water Interaction

Salt water intrusion of shallow aquifers was observed historically near South San Francisco Bay and adjacent to the tidal reaches of the Guadalupe River, Coyote Creek, and other creeks in the northern portion of the Santa Clara Plain. As previously discussed, the District has implemented managed recharge and in-lieu recharge programs to minimize the risk of groundwater overdraft, land subsidence, and salt water intrusion.

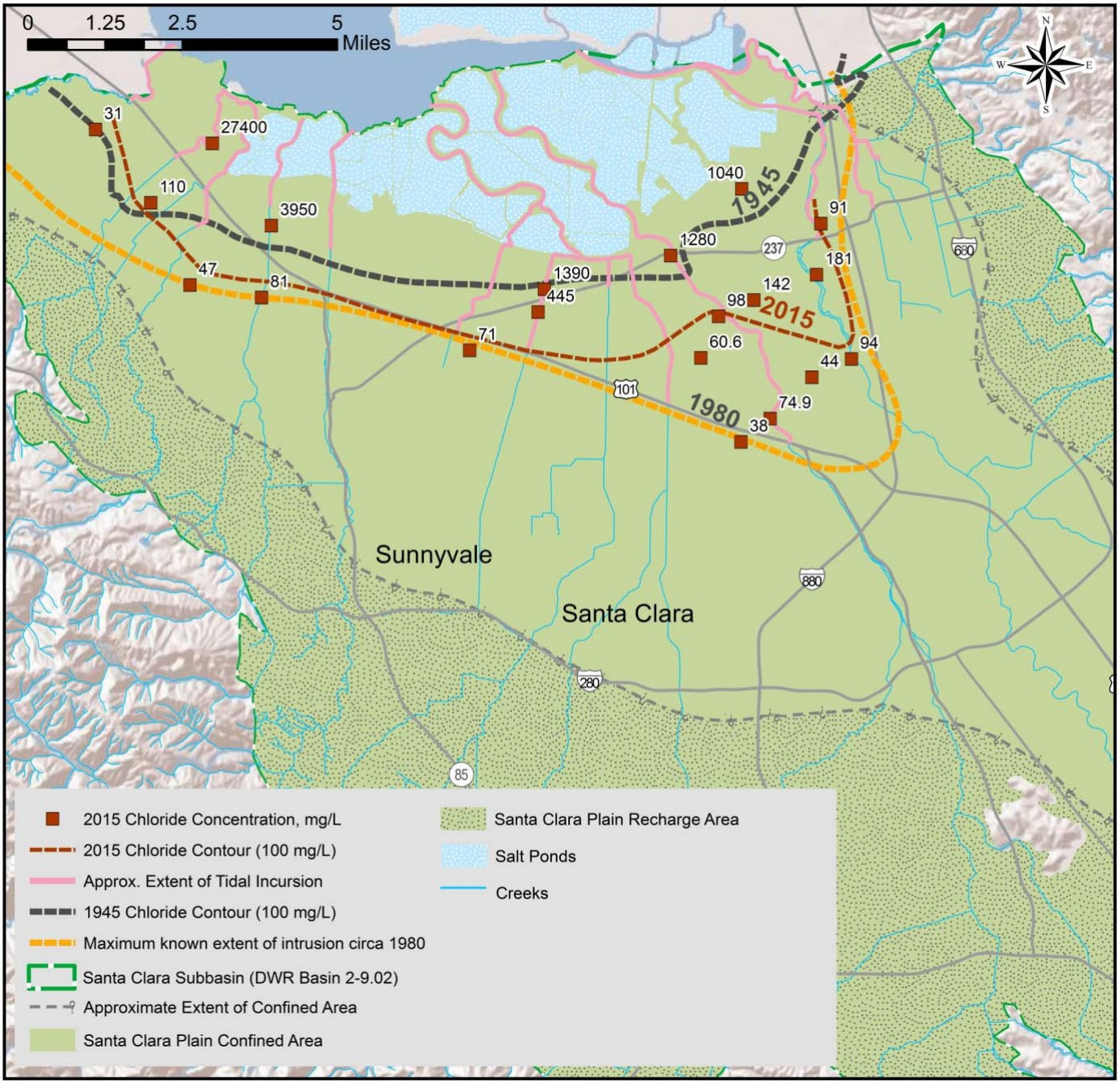
Groundwater and salt water interaction in the shallow aquifer zone adjacent to southern San Francisco Bay and near tidal reaches of creeks was evaluated based on the chloride content of samples from shallow monitoring wells not used for domestic or municipal supply. The District uses a chloride concentration of 100 mg/L to indicate influence from salt water. This is a conservative indicator as the aesthetic-based secondary MCL for chloride is 250 mg/L.

As shown on Figure 25, wells in which chloride is over 100 mg/L are located in a narrow band adjacent to the former salt evaporation ponds, except in the areas adjacent to Guadalupe River and Coyote Creek. In these areas, a larger portion of the shallow aquifer is affected due to tidal incursion in these channels that occurs due to historic land subsidence. A significant increase in chloride content is observed near the levee system that defines former salt evaporation ponds. The majority of shallow wells in this area have downward trends for chloride, demonstrating that the salt water intrusion front appears to be stable or retreating.

Historically, few wells in the principal aquifer zone were found to have elevated TDS, and the chloride concentrations noted were relatively low. Salt water intrusion of the principal aquifer may occur from shallow saline groundwater via vertical conduits such as abandoned wells when the vertical hydraulic gradient is downward. The source of the elevated TDS in deeper wells in some areas has been characterized as connate water (trapped salt water from the geologic past), rather than recent saline intrusion. The District currently conducts only limited monitoring of the principal aquifer in the Baylands area because few deeper wells are available. Migration of saline shallow groundwater into the principal aquifer has been prevented due to the District's managed and in-lieu recharge programs, which maintains artesian conditions (upward vertical gradient) in the Baylands area. Tidal incursion in the bayward reaches of streams still occurs, and continues to introduce saline water to the shallow aquifer, as observed in elevated chloride concentrations in shallow aquifer wells in the Baylands area.

Remainder of Page Intentionally Left Blank

Figure 25 Groundwater and Salt Water Interaction in Shallow Aquifer



5.3 Domestic Well Water Quality

In addition to conducting regional groundwater monitoring, the District offers basic water quality testing to eligible domestic well owners within the District's groundwater charge zones. In CY 2015, the District tested 26 domestic wells in North County and 186 wells in South County. Basic water quality parameters tested include nitrate, bacteria, electrical conductivity, and hardness.

Domestic well data helps improve the District's understanding of the occurrence of common contaminants and provides important information that helps well owners understand their water quality. Although private domestic wells are not regulated by the state, the comparison to state drinking water standards provides context for results. Table 9 summarizes the results for each charge zone, and compares findings to drinking water standards.

Nitrate was detected above the MCL at 8% of North County and 26% of South County domestic wells tested. The median nitrate concentration in domestic wells in North County was 12.7 mg/L, and in South County the median was 29.3 mg/L. The 2015 median values for each groundwater subbasin were similar to the 2014 medians. Per Table 7, the CY 2015 regional median values for the Santa Clara Plain, Coyote Valley, and Llagas Subbasin, were 13, 23.8, and 28.6 mg/L, respectively.

Table 9 CY 2015 Domestic Well Testing Results

Parameter and Units	MCL[1]	Zone W-2 North County		Zone W-5 South County	
		Median	Wells above MCL[1] (%)	Median	Wells above MCL[1] (%)
Nitrate (mg/L)	45 (P)	12.7	8%	29.3	26%
Fluoride (mg/L)	2 (P)	0.10	0%	0.10	0%
Electrical Conductivity (uS/cm)	900 (S)	830	42%	645	14%
Sulfate (mg/L)	250 (S)	50.8	0%	35.8	0%
Hardness (mg/L as CaCO3)	--	384	--	271	--
		No. Wells with Bacteria Present	% Wells with Bacteria Present	No. Wells with Bacteria Present	Wells with Bacteria Present (%)
Total Coliform Bacteria	--[2]	11	42%	67	36%
E. Coli Bacteria	--[2]	1	4%	3	2%

Notes:

1) Maximum contaminant levels are established by the DDW for public water systems. (P) indicates the parameter has a health-based primary MCL and (S) indicates a secondary, aesthetic-based MCL. Hardness does not have a primary or secondary MCL but water with hardness above 180 mg/L is classified as very hard. Water quality in domestic wells is not regulated by the state.
2) Bacteria are measured as present or absent. Public water systems are required to ensure that fewer than 5% of samples have total coliform present and that no samples have E. Coli present.

Countywide, total coliform bacteria were detected in about 37% of the domestic wells tested, a slight increase over 2014 countywide detections. Coliform bacteria are naturally present in humans, animals, and the environment and do not normally cause illness, but they should not be present in drinking water. Escherichia coli (E. coli), a type of bacteria indicative of fecal contamination, were detected in about 2% of the domestic wells tested countywide.

The continued presence of nitrate above the MCL in many domestic wells highlights the need for continued efforts to reduce well owners' exposure to nitrate. The District began implementation of a multi-year rebate program for nitrate treatment systems in the fall of 2013 and continues to offer this program. This effort complements outreach and other efforts to reduce nitrate loading in coordination with the Central Coast Water Board and other basin stakeholders.

5.4 Recharge Water Quality

The District monitors surface water quality at selected in-stream and off-stream recharge facilities to characterize recharge water quality and assess how groundwater quality may be influenced by managed recharge. The source of managed recharge water at each facility varies, and may consist of imported water, local water, or a blend of the two. Monitoring is conducted in accordance with the District's Recharge Water Quality Monitoring Plan,[15] which includes sampling each recharge system every three years.

In 2015, the District monitored seven facilities in the Los Gatos and Upper Llagas recharge systems in September, and nine facilities in December (Table 10). Due to ongoing drought conditions, reservoir releases to creeks and ponds were reduced and some facilities were dry. The samples that could be collected were analyzed for major and minor ions, trace elements, and select organic compounds. Testing of organic compounds was conducted at recharge facilities located near potentially contaminating sources (e.g., industrial and automotive chemical sources or herbicide/pesticide application areas) to evaluate potential impacts from runoff during the wet sampling event in December.

Table 10 CY 2015 Recharge Water Quality Sampling Locations

Recharge System	Facilities Sampled	
	September 2015	December 2015
Los Gatos	Camden Ponds (2 locations) and Los Gatos Creek (2 locations)	Camden Ponds (2 locations), Los Gatos Creek (4 locations)
Upper Llagas	Madrone Channel (3 locations)	Madrone Channel (3 locations)

Although managed recharge water is not suitable for direct consumption before treatment or infiltration, comparing it to drinking water standards provides context for results. No parameters were detected above health-based drinking water standards in any of the recharge water samples. Volatile or semi-volatile organic compounds (including pesticides) were not detected in any samples. Table 11 and 12 provide water quality indicators for salinity, non-point source pollution, and trace metals. Results are compared against median groundwater concentrations for the corresponding groundwater subbasin area.

[15] Santa Clara Valley Water District, Recharge Water Quality Monitoring Plan, September 2012.

Table 11 Summary of Key Water Quality Indicators for All Recharge Systems Sampled in September 2015

Parameter	Units	Los Gatos System Median[1]	Upper Llagas System Median[1]	MCL	SMCL	Regional Groundwater Concentration[2]	
						Santa Clara Plain	Llagas
TDS	mg/L	340	370	-	500	400	371
Total Alkalinity (as CaCO3)	mg/L	123	94	-	-	229	192
Chloride	mg/L	67	111	-	250	46	40.7
Sulfate	mg/L	68	53	-	250	42	36
pH	pH units	8.3	8.5	-	6.6-8.5	7.4	7.7
Nitrate (as NO3)	mg/L	0.71	2.48	45	-	13	29
Aluminum	ug/L	ND	ND	1000	200	22.8	15.9
Iron	ug/L	0.05	0.05	-	300	20.7	9.1

Notes:

1) Table contains the median value for all stations sampled within the recharge system.

2) Typical groundwater concentration is the 2015 median for the principal zone of the Santa Clara Plain and Llagas Subbasin.

Table 12 Summary of Key Water Quality Indicators for All Recharge Systems Sampled in December 2015

Parameter	Units	Los Gatos System Median[1]	Upper Llagas System Median[1]	MCL	SMCL	Regional Groundwater Concentration[2]	
						Santa Clara Plain	Llagas
TDS	mg/L	347	398	-	500	400	371
Total Alkalinity (as CaCO3)	mg/L	110.5	94	-	-	229	192
Chloride	mg/L	79.5	118	-	250	46	40.7
Sulfate	mg/L	51.7	51.1	-	250	42	36
pH	pH units	7.65	NA	-	6.6-8.5	7.4	7.7
Nitrate (as NO3)	mg/L	0.96	0.80	45	-	13	29
Aluminum	ug/L	0.05	0.05	1000	200	22.8	15.9
Iron	ug/L	0.05	0.05	-	300	20.7	9.1

Notes:

1) Table contains the median value for all stations sampled within the recharge system.

2) Typical groundwater concentration is the 2015 median for the principal zone of the Santa Clara Plain and Llagas Subbasin.

5.5 Monitoring Near Recycled Water Irrigation Sites

The District partners with the four recycled water producers in the county[16] to expand recycled water use for non-potable purposes like large landscape irrigation, agriculture, and industrial uses. Tertiary treated recycled water generally has higher concentrations of salts, nutrients, disinfection byproducts, and emerging contaminants than local groundwater or treated water[17]. Contaminants may be introduced to groundwater through landscape irrigation, and previous studies near recycled water irrigation sites have noted evidence of significant recycled water contribution to shallow wells[18].

In 2011, the District completed the Recycled Water Irrigation and Groundwater (RWIG) Study[19] which included a field study at a recycled water irrigation site, the Integrated Device Technology (IDT) campus. The study did not find significant changes in groundwater quality for most constituents after recycled water irrigation. However, several constituents were detected at low levels, including perfluorochemicals (PFCs) and N-Nitrosodimethylamine (NDMA, a disinfection byproduct). The study suggested that best management practices and/or changes in recycled water treatment to remove emerging contaminants may be warranted for irrigating with recycled water in sensitive groundwater areas.

The District and South Bay Water Recycling (SBWR) have worked to improve recycled water quality for irrigation and other uses. Since March 2014, recycled water provided by SBWR has been blended with advanced treated water from the District's Silicon Valley Advanced Water Purification Center (SVAWPC), which produces up to eight million gallons of water a day using microfiltration, reverse osmosis, and ultraviolet light. The blended recycled water has improved water quality, with TDS lowered from about 750 mg/L to about 500 mg/L.

To monitor impacts to groundwater resources, the District evaluates potential groundwater quality changes near selected sites irrigated with tertiary treated recycled water. Figures 26 and 27 present monitoring wells near facilities using recycled water for irrigation. Over the past few years the District has monitored three sites where recycled water is used for irrigation, one in the Santa Clara Subbasin and two in the Llagas Subbasin. As part of recycled water expansion in the Llagas Subbasin, five new monitoring sites were added in 2014, and nine were added in December 2015 to establish baseline groundwater quality prior to recycled water use. The District also evaluates groundwater data at recycled water irrigation sites collected by SBWR and others as shown in Table 13. Statistical analysis of trends and geochemical methods are used to evaluate water quality changes.

---

[16] Recycled water is produced at the Palo Alto Regional Water Quality Control Plant, San Jose/Santa Clara Water Pollution Control Plant (WPCP), the Sunnyvale WPCP and the South County Regional Wastewater Authority.

[17] Advanced Recycled Water Treatment Feasibility Project, Black & Veatch, Kennedy/Jenks for the Santa Clara Valley Water District, August 2003. In the Llagas subbasin, nutrient content of recycled water is lower than ambient groundwater concentrations (Llagas Subbasin Salt and Nutrient Management Plan).

[18] California GAMA Program: Fate and Transport of Wastewater Indicators: Results from Ambient Groundwater and from Groundwater Directly Influenced by Wastewater, Lawrence Livermore National Laboratory and California State Water Resources Control Board, June 2006.

[19] Locus Technologies for Santa Clara Valley Water District, Recycled Water Irrigation and Groundwater Study, Santa Clara and

Llagas Groundwater Subbasins, Santa Clara County, California, August 2011.

Figure 26 Groundwater Monitoring Near Facilities Using Recycled Water - Santa Clara Subbasin

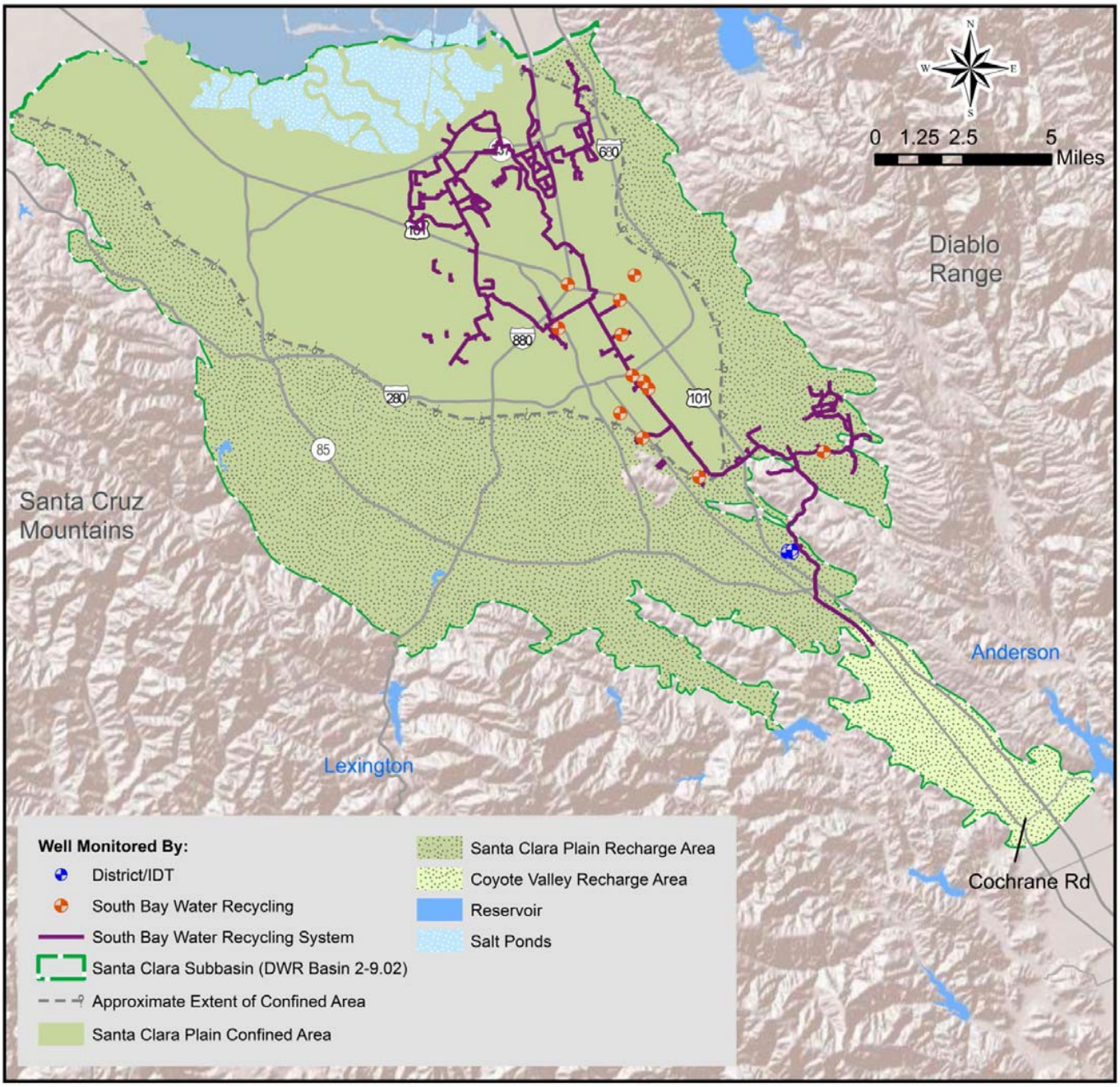


Figure 27 Groundwater Monitoring Near Facilities Using Recycled Water - Llagas Subbasin

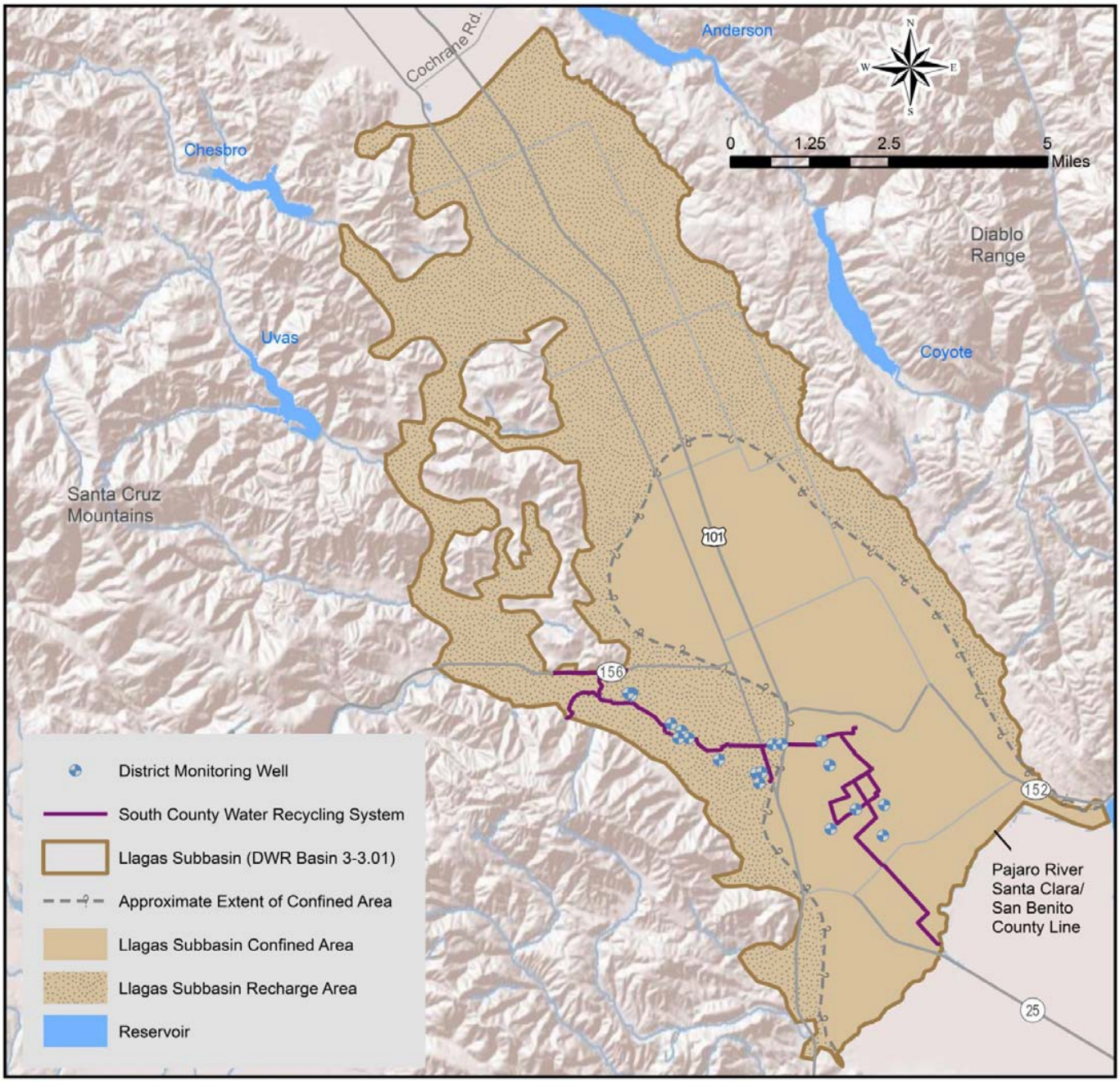


Table 13 2015 Groundwater Monitoring near Recycled Water Irrigation Sites

Subbasin	Location	Sampling Agency	Sampling Summary
Santa Clara Subbasin	Integrated Device Technology (IDT) Campus, Edenvale area of San Jose	IDT and District	• Although recycled water continues to be used for irrigation at this site, the 4 shallow wells were dry in 2015. • Recycled water delivered to this site was sampled in October 2015.
	Various Locations in San Jose	South Bay Water Recycling	• 5 shallow and 4 deep wells were monitored in February 2015 by the City of San Jose per their Groundwater Mitigation and Monitoring Plan (GMMP). • Parameters analyzed include basic salts and minerals, alkalinity and TDS.
Llagas Subbasin	Christmas Hill Park, Gilroy	District	• 3 shallow wells were sampled quarterly. • Parameters analyzed include basic water quality parameters, ions, DBPs, PFCs, bacterial parameters, and others commonly encountered in treated recycled water.
	Irrigated Land Near SCRWA Plant, Gilroy	District	• 4 shallow wells were sampled quarterly except one well that was dry in September. • Parameters analyzed include basic water quality parameters, ions, DBPs, PFCs, bacterial parameters, and others commonly encountered in treated recycled water.
	Irrigated Land Along Phase 1B Pipeline Alignment (West Gilroy)	District	• 3 shallow monitoring wells and 1 deep well were sampled quarterly. • One well remained dry in 2015. • Parameters analyzed include basic water quality parameters, ions, DBPs, PFCs, bacterial parameters, and others commonly encountered in treated recycled water.

As shown in Table 14, monitoring results at several sites show increasing trends for salts and low-level detections of NDMA, PFCs, and other constituents. In most cases, these contaminants were not present prior to the use of recycled water. There is some evidence that recycled water is mixing with shallow groundwater based on the geochemical analysis of groundwater. Based on these findings, it is likely that changes in shallow groundwater quality are occurring as a result of irrigation with recycled water. The District will continue to analyze data from these sites, and will evaluate if shallow groundwater quality improves with time due to improved recycled water quality resulting from the blending of tertiary treated recycled water and purified water from SVAWPC.

Table 14 Key Findings from Recycled Water Irrigation Site Monitoring

Subbasin	Location	Highlights
Santa Clara Subbasin	IDT	• Due to continued drought conditions, these wells were dry throughout 2015. District staff continues to check water levels monthly. Once water levels return to normal the District will resume sampling from these wells.
	SBWR	• The basic chemical composition for various shallow wells indicates a shift towards more saline water, primarily due to increasing chloride at the Kelley Park and Columbus Park wells. • Increasing trends continue to be observed for chloride, boron, sodium, and sulfate at many of the GMMP wells monitored in 2015.
Llagas Subbasin	Christmas Hill Park	• Groundwater quality at wells 11S03E12A002 and 11S03E12A003 have similar sodium and chloride molar ratios as recycled water and show a slight ionic shift towards recycled water. • Groundwater quality at well 11S03E01Q002 continues to be influenced by adjacent Uvas Creek, although chloride trends appear to be increasing. • Chloride and TDS trends in wells 11S03E12A002 and 11S03E12A003 are increasing. Sodium trends are decreasing in well 11S03E01Q002. • Continued detections (<1 ug/L) for PFOA and PFOS were observed in wells 11S03E12A002 and 11S03E12A003. • NDMA was detected twice in the source water and an overall decreasing trend is apparent. PFOA was detected twice in the source water.
	Irrigated Land Near SCRWA	• Groundwater quality at wells 11S04E15M002, 110S04E16F001 and 11S04E16M011 indicate similar molar ratios as recycled water. • The basic chemical composition for all wells (except deep well 11S04E16G003) indicates mixing with recycled water, in particular for chloride and sulfate. • Increasing trends were observed for most salts in well 11S04E15M002. • Decreasing trends were observed for most salts at well 11S04E16G003. • The secondary MCL for TDS was exceeded in all wells. • Trends for PFOA are decreasing in the source water and wells 110S04E16F001 and 11S04E16G003. PFOS concentrations indicate a decreasing trend at well 11S04E15M002 and 11S04E16G003. • NDMA and NDPA were detected in all four quarters in the source water, but not in any wells. Trends appear to be decreasing for NDMA in the source water.
	Irrigated Land Along Phase 1B Pipeline Alignment in Gilroy	• With the exception of well 11S04E09M001, basic chemical composition continues to resemble background groundwater chemistry. • Sampling at well 11S04E09M001 indicates high alkalinity, calcium and magnesium concentrations. • Detected compounds in well 11S04E09M001 include NDMA, PFOA, PFOS and PFBA. • An increasing trend for chloride was observed at well 11S04E07F004.

5.6 Salt and Nutrient Management Plans

The State Water Resources Control Board's 2009 Recycled Water Policy requires the development of regional Salt and Nutrient Management Plans (SNMPs). The purpose of the SNMPs is to address current and future regional salt and nutrient loading to groundwater from all sources, including recycled water and agricultural activity. The District completed two SNMPs for the Santa Clara and Llagas Subbasins by working with local stakeholders and regulators, and completing detailed salt balance analyses. The plans are posted to the District's website[20] and include: salt and nutrient source identification, loading and assimilative capacity estimates, water recycling and storm water recharge goals and objectives, implementation measures, groundwater monitoring provisions, and an anti-degradation analysis. The SNMPs were completed in 2014; the Central Coast and San Francisco Bay Water Boards will use these plans to update their basin plans and evaluate recycled water projects.

5.7 Contaminant Release Sites

There are over 400 open cases where non-fuel contaminants have been released to soil and/or groundwater in the county. These cases are overseen by the California Department of Toxic Substances Control, and the Central Coast and San Francisco Regional Water Quality Control Boards. There are also over 150 open fuel leak sites overseen by the Santa Clara County Department of Environmental Health (SCDEH) and 25 Superfund sites overseen by the United States Environmental Protection Agency (USEPA). Although there have been very limited impacts to principal drinking water aquifers from these sites, they pose a potential threat to groundwater quality.

Due to the large number of contaminated sites, District staff prioritizes which cases are closely tracked. Currently, staff monitors progress at several sites considered to be of the highest priority based on groundwater vulnerability, proximity to water supply wells or surface water, and contaminant concentration.

District staff reviews monitoring and progress reports submitted to regulatory agencies by responsible parties, as well as any regulatory orders or correspondence. Staff attends community meetings for the Olin, Middlefield-Ellis-Whisman (MEW), and Moffett Field cases, and advocates for expedited cleanup of high-threat cases through collaboration with regulatory agencies. The District also provides technical review of other contaminant release sites when requested by regulatory agencies.

Key 2015 activities related to high priority contaminant release cases are as follows:

- Olin Corporation, 425 Tennant Avenue, Morgan Hill

  Perchlorate cleanup activities by the responsible party, including the off-site extraction system, continued. As of December 2015, over 2,750 AF of water have been treated and 191 pounds of perchlorate have been removed. Sampling in preparation for the Gradient Driven Remediation (GDR) pilot study found perchlorate further east of the site than expected, which led to additional characterization activities to better define the extent of contamination. The Central Coast Water Quality Control Board issued a Monitoring and Reporting Program for the GDR pilot study in November 2015. The pilot study began in January 2016. Staff continues to participate in the Perchlorate Community Advisory Group meetings and advocate for expedited cleanup.

[20] http://www.valleywater.org/GroundwaterStudies/

- Hillview Cleaners, 1440 Big Basin Way, Saratoga

  The Hillview Cleaners site is a dry cleaner site that has released perchloroethylene (PCE) to soil and groundwater. PCE has also been detected in Saratoga Creek. District staff reviewed the December 18, 2015 Remedial Action Plan submitted to the San Francisco Regional Water Quality Control Board, which proposed offsite in-situ remediation methods. The District will continue to engage in the review of related site documents and advocate for timely and thorough cleanup.

- Moffett Field, Middlefield-Ellis-Whisman (MEW)

  This area includes four Superfund sites and more than 15 individual contaminant release sites with soil and shallow groundwater contamination by trichloroethylene (TCE) and other VOCs. District staff continues to participate in related MEW, Moffett Field Regional Advisory Board and EPA community meetings.

- United Technologies Corporation

  There were perchlorate detections up to 39 ug/L in the creek draining to Anderson Reservoir in 2015. However, perchlorate has not been detected in Anderson Reservoir above laboratory reporting limits. Between May 2014 and April 2015, 20 million gallons of groundwater were treated, removing 16.7 lbs of VOCs, 81.2 lbs perchlorate, and 0.6 lbs 1,4-dioxane. Concentrations of perchlorate, VOCs, and 1,4-dioxane in monitoring wells remained relatively constant in 2015. UTC prepared a feasibility study to eliminate discharge of groundwater containing as much as 100 mg/L perchlorate to a swale in Mixer Valley. UTC will implement a $1.1 million plan to fill the swale to prevent discharge of groundwater to surface water and to eliminate the potential for discharge to Mixer Creek. UTC has proposed reducing their reporting frequency to annually.

- Fuel Leak Cases

  District staff continues to coordinate with the SCDEH to provide technical support and review as necessary. The District received over 25 public notices of fuel leak site closures; all proposed closures appeared to be warranted and no comments were submitted.

Remainder of Page Intentionally Left Blank

The evaluation of 2015 groundwater quality data against GWMP outcome measures is summarized below. Additional discussion of outcome measures, including planned action to address measures not being met, is presented in Section 7.

Groundwater Quality Outcome Measures

OM 2.1.1.e.
At least 95% of countywide water supply wells meet primary drinking water standards.

OM 2.1.1.f.
At least 90% of South County wells meet Basin Plan agricultural objectives.

OM 2.1.1.g.
At least 90% of wells in both the shallow and principal aquifer zones have stable or decreasing concentrations of nitrate, chloride, and total dissolved solids.

OM 2.1.1.e. is not met as 84% of countywide water supply wells tested in 2015 met primary drinking water standards. The exceedances were due to elevated nitrate in South County, primarily in domestic wells. If nitrate is not included, 100% of water supply wells met primary drinking water standards.

OM 2.1.1.f. is met as 98% of all South County wells met Basin Plan agricultural objectives in 2015.

OM 2.1.1.g. is partially met. This measure is not met for chloride, with 84% of wells showing stable or decreasing concentrations. This measure is met for nitrate as 93% of wells had stable or decreasing concentrations. This measure is met for total dissolved solids as 94% of wells had stable or decreasing concentrations.

6. OTHER GROUNDWATER MANAGEMENT ACTIVITIES

Other District groundwater management activities in CY 2015 included permitting and inspecting over 1,800 wells, reviewing relevant policy and land use proposals, and conducting public outreach on groundwater.

6.1 Well Ordinance Program

The District's well ordinance program helps ensure that wells and other deep excavations are properly constructed, maintained, and destroyed so they prevent vertical transport of contaminants into deep drinking water aquifers. The District issued over 1,900 well permits in 2015, primarily for well destruction and monitoring well construction. The District also inspected over 1,800 wells to ensure they were properly constructed or destroyed (Table 15).

Table 15 2015 District Well Permit and Inspection Summary

Permit Type	Number Processed
Well Construction - Water Producing Wells	115
Well Construction - Monitoring Wells	398
Well Destruction	1,253
Exploratory Boring	224
Total	**1,990**
Inspection Type	**Number Inspected**
Well Construction - Water Producing Wells	87
Well Construction - Monitoring Wells	349
Well Destruction	1,173
Exploratory Boring	247
Total	**1,856**

6.2 Policy and Legislation Review

The District reviews proposed legislation and policies (both statewide and local) to ensure the county's water resources and the District's ability to manage them are protected. Related 2015 reviews focused on Sustainable Groundwater Management Act (SGMA) required regulations and cleanup legislation. This included District review and comment on DWR proposed basin boundary modification regulations, and tracking of various assembly and senate bills.

The District is subject to SGMA requirements as the Santa Clara and Llagas Subbasins are designated as medium priority and high priority, respectively. SGMA requires the formation of Groundwater Sustainability Agencies (GSAs) for all groundwater subbasins classified as medium or high priority by June 30, 2017. A Groundwater Sustainability Plan (GSP) must be submitted for these basins by January 2020 for basins in critical overdraft, or by January 2022 for other basins. Alternatives to GSPs must be submitted by January 2017. SGMA provides broad authorities to GSAs, including the ability to meter wells, restrict pumping, implement conjunctive management projects and fund them through various fees. These authorities are in addition to any authority provided through existing statute, such as what is provided by the District Act.

Following a public hearing, the District Board adopted a resolution to become the GSA for the Santa Clara and Llagas Subbasins in May 2016. The state adopted regulations for GSPs and alternative plans in June 2016. It is assumed that the District's GWMP will require relatively minor updates to qualify as an alternative plan that meets SGMA requirements. The District plans to submit a Board-adopted alternative plan to DWR by the January 2017 statutory deadline.

6.3 Land Use Review

Threats to groundwater quality include urban runoff, industrial chemical releases, inefficient agricultural practices, and leaking underground storage tanks. Of particular concern are potentially contaminating activities over groundwater recharge areas, which are more vulnerable to contamination due to more permeable soils and higher groundwater flow rates. Proposed development and redevelopment may also result in additional groundwater demands or impacts to water supply reliability. Land use decisions fall under the authority of the local cities and the County of Santa Clara. The District reviews land use and development plans related to District facilities and watercourses under District jurisdiction, and provides technical review for other land use proposals as requested by the local agency. Water supply assessments for new developments are also reviewed and evaluated in the context of the District's long-term water supply planning assumptions. For all reviews, the District's groundwater-related comments focus on additional analysis or action needed to ensure groundwater resources are adequately protected.

In CY 2015, the District submitted groundwater-related comments to on the following land use proposals:

- The water supply assessment section of the Draft Environmental Impact Report for the North Gilroy Neighborhood Districts Urban Service Area Amendment.
- The Final Environmental Impact Report for City Place Santa Clara.

6.4 Public Outreach

Public outreach is an important component of the District's groundwater protection efforts. To help keep the public informed about current groundwater and water supply conditions, the District prepares monthly Water Tracker reports that are posted on the District website[21]. The District also posts monthly groundwater condition reports that contain more detailed information on groundwater pumping, recharge, and water levels.

Because groundwater is far removed from the public's view, it can be a challenge to make the connection that actions occurring on the land surface can impact groundwater quality. In 2015, the District celebrated Groundwater Awareness Week (March 8-14) by adopting a Board resolution commemorating the week, highlighting groundwater on the District website, and posting social media messages.

The District also maintained its status as a Groundwater Guardian Affiliate through the Groundwater Guardian Program sponsored by the Groundwater Foundation, a non-profit organization. Groundwater Guardian is an annually earned designation for communities and affiliates that take voluntary, proactive steps toward groundwater protection. District activities include the school program (which reaches thousands of students each year), implementation of groundwater

[21] www.valleywater.org/WaterTracker.**aspx**

protection programs, and participation in workshops such as the Small Acreage Stewardship series. At this series, District staff presents targeted information on wells and water quality protection to well owners.

The District mails the Annual Groundwater Quality Summary to all well owners in June to provide information on sampling by the District and local water suppliers. The 2015 Groundwater Quality Summary was mailed in June 2016 (Appendix A). This summary is similar to water retailer consumer confidence reports, and provides basic groundwater quality information to domestic well owners who do not typically receive water from a water retailer.

Remainder of Page Intentionally Left Blank

7. CONCLUSIONS

Groundwater conditions improved in 2015 due to increased water supplies and the impressive 27% water use reduction achieved by customers served by water retailers as compared to 2013. However, groundwater levels and storage continued to be affected by the ongoing drought. Table 16 shows data for key indicators as compared to last year and the last five years (2010 to 2014). The managed recharge program was significantly increased compared to the previous year, but remained well below the 5-year average due to limited imported and local surface water. Groundwater pumping decreased significantly due to water use reduction efforts, but due to limited recharge groundwater storage decreased by 26,300 AF. The reduced groundwater pumping resulted in increased groundwater levels in many areas of the Santa Clara Plain and Coyote Valley, but levels continued to decrease in the Llagas Subbasin. Groundwater levels at all index wells were above historic lows. Groundwater quality conditions were generally similar to the previous year and the last five years, with nitrate remaining the primary groundwater protection challenge, particularly in South County.

Table 16 CY 2015 Groundwater Conditions as Compared to Other Indices

Index[1]	2015	Compared to 2014	Compared to Last 5 Years (2010 - 2014)
Managed Recharge (AF)	54,900	Up 113%	Down 35%
Groundwater Pumping (AF)	118,500	Down 30%	Down 17%
Groundwater as % of Total Water Use	42%	Down 9%	No Change
Groundwater Levels (feet)[2]			
Santa Clara Plain	49.8	Up 20%	Down 23%
Coyote Valley	259.3	Up 1%	Down 2%
Llagas Subbasin	188.9	Down 2%	Down 14%
End of Year Groundwater Storage (AF)	229,100	Down 10%	--
Land Subsidence (feet/year)[3]	0.005	Decrease	--
Groundwater Quality [4]			
Santa Clara Plain – Median TDS, mg/L	400	No Change[5]	No Change
Coyote Valley – Median TDS, mg/L	380	No Change	No Change
Llagas Subbasin – Median TDS, mg/L	371	No Change	No Change
Santa Clara Plain – Median Nitrate, mg/L	13	No Change	Decrease
Coyote Valley – Median Nitrate, mg/L	23.8	No Change	No Change
Llagas Subbasin – Median Nitrate, mg/L	28.6	No Change	No Change

1. Groundwater levels and quality are shown for three groundwater management areas: the Santa Clara Plain Principal Aquifer and Coyote Valley (which comprise the Santa Clara Subbasin) and the Llagas Subbasin Principal Aquifer.
2. Groundwater elevations represent the average of all readings at groundwater level index wells for the time period noted.
3. The established tolerable rate of 0.01 feet per year was not exceeded. Water levels at all subsidence index wells were above these thresholds throughout 2015.
4. Values shown represent median groundwater quality for all principal aquifer zone wells tested. Nitrate is measured as NO_3. Data from shallow monitoring wells is excluded, including wells with high TDS due to saline intrusion.
5. Individual wells sampled for TDS and nitrate vary each year so a straight numeric comparison of median values is not performed. “No change” indicates no significant difference using an appropriate statistical test (Mann-Whitney Test) at 95% confidence level. An entry of either “Increase” or “Decrease” indicates a statistically significant change for the time period indicated.

Outcome Measure Performance and Action Plan

The District's GWMP identifies several outcome measures to assess whether basin management objectives are being accomplished. The measurement of CY 2015 data against these measures is summarized in Table 17 below, along with recommended actions to address measures not being met.

Table 17 Summary of Outcome Measure Performance and Action Plan

Groundwater Storage	**OM 2.1.1.a.** Greater than 278,000 AF of projected end of year groundwater storage in the Santa Clara Plain. Estimated end of 2015 Storage: 214,800 AF **OM 2.1.1.b.** Greater than 5,000 AF of projected end of year groundwater storage in the Coyote Valley. Estimated end of 2015 Storage: 400 AF **OM 2.1.1.c.** Greater than 17,000 AF of projected end of year groundwater storage in the Llagas Subbasin. Estimated end of 2015 Storage: 13,900 AF
	Action Plan for OM 2.1.1.a, b, and c: In accordance with the Water Shortage Contingency Plan, the District Board of Directors called for a 30% countywide water use reduction in March 2015. In June 2016, this was adjusted to 20% in light of improved supplies.
Groundwater Levels and Subsidence	**OM 2.1.1.d.** 100% of subsidence index wells groundwater levels above subsidence thresholds. All ten subsidence index wells had groundwater levels above thresholds in 2015.
Groundwater Quality	**OM 2.1.1.e.** At least 95% of countywide water supply wells meet primary drinking water standards. Only 84% of countywide water supply wells tested in 2015 met primary drinking water standards due to elevated nitrate in South County (mainly in domestic wells). If nitrate is not included, 100% of water supply wells met primary drinking water standards. **OM 2.1.1.f.** At least 90% of South County wells meet Basin Plan agricultural objectives. Nearly all wells (98%) met Basin Plan agricultural objectives.
	Action Plan for OM 2.1.1.e: Implement Salt and Nutrient Management Plans to address salt loading, continue free testing program for domestic wells, and work to increase participation in the nitrate treatment system rebate program.
Groundwater Quality Trends	**OM 2.1.1.g.** At least 90% of wells in both the shallow and principal aquifer zones have stable or decreasing concentrations of nitrate, chloride, and total dissolved solids. This measure is nearly met for chloride, with 84% of wells showing stable or decreasing concentrations. This measure is met for nitrate and total dissolved solids as stable or decreasing concentrations were observed in 93% and 94% of wells, respectively.
	Action Plan for OM 2.1.1.g: Implement Salt and Nutrient Management Plans to address salt loading.

Outcome measure met
Outcome measure not met

Groundwater Outlook

Groundwater levels and storage have begun to recover with improved rainfall and increased surface water available for managed recharge in CY 2015. Groundwater storage has been critical in helping to meet the county's water supply needs during the ongoing drought. The estimated end of year storage for 2015 was below the 300,000 AF target but water levels did not exceed subsidence thresholds in related index wells. In accordance with the Water Shortage Contingency Plan, the District Board set a 30% water use reduction target (compared to 2013) in March 2015. The water use reduction target was adjusted to 20% in June 2016 due to improved water supply conditions.

The District continues to actively monitor groundwater levels, land subsidence, and water quality to support operational decisions and ensure groundwater resources are protected. To help ensure water supply reliability, the District is also working to expedite several IPR projects to provide a drought-proof source of purified water for groundwater replenishment. The District will also continue to track proposed legislation, policies, and regulatory standards that may impact groundwater resources or the District's ability to manage them.

Compliance with SGMA will be a major focus of District groundwater management in CY 2016. The District was deemed the exclusive Groundwater Sustainability Agency (GSA) for the Santa Clara and Llagas Subbasins on June 22, 2016 by DWR. The District's scientific basin boundary modification request for the Llagas Subbasin has been approved by DWR and will be included in a revised DWR Bulletin 118 in late 2016. The District will update the 2012 Groundwater Management Plan for submittal to DWR as an Alternative to a Groundwater Sustainability Plan under SGMA.

Remainder of Page Intentionally Left Blank

Appendix A

2015 Groundwater Quality Summary Provided to Well Owners

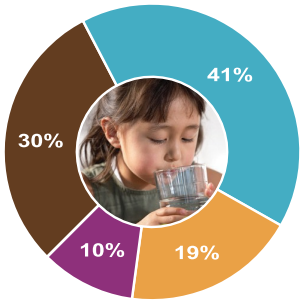
Santa Clara Valley Water District

Groundwater Quality Summary Report

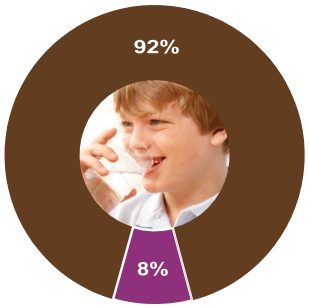
For Testing Performed in 2015

Protecting our Groundwater

NORTH COUNTY WATER USE



SOUTH COUNTY WATER USE



- Groundwater
- Treated Water
- Hetch-Hetchy
- Other Local and Recycled Water

Groundwater is an essential local resource, providing about half of the water used in Santa Clara County each year. In some areas, groundwater is the only source of drinking water. Protecting our groundwater helps ensure adequate supplies are available now and in the future.

The Santa Clara Valley Water District works to safeguard groundwater by:

- Replenishing groundwater with local and imported surface water.
- Reducing demands on groundwater through the delivery of treated water, water conservation and water recycling.
- Monitoring groundwater and implementing programs to protect against contamination.

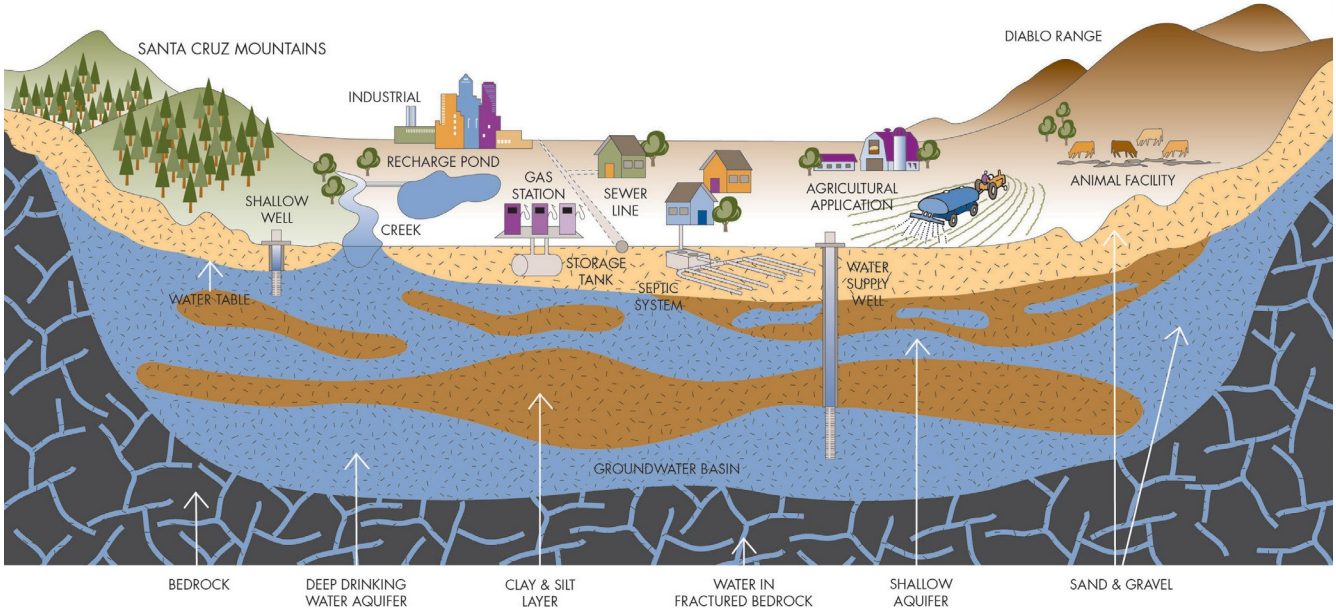
Regular well testing throughout the county indicates that groundwater quality is generally very good. Drinking water, including bottled water, may contain at least small amounts of some contaminants. As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals and radioactive materials, and can pick up substances from animal and human activities.

Contaminants that may be present include:

- Microbial contaminants such as viruses and bacteria that may come from sewage treatment plants, sewer lines, septic systems, agricultural operations and wildlife.
- Inorganic contaminants such as salts and metals that can be naturally occurring or result from stormwater runoff, industrial or domestic wastewater discharges, animal facilities, farming, and mining.
- Pesticides, fertilizers and herbicides that may come from agriculture, stormwater runoff and residential uses.
- Organic chemicals including synthetic and volatile organic chemicals from industrial processes, gas stations, dry cleaners, stormwater runoff, agricultural application and septic systems.
- Radioactive contaminants that are typically naturally occurring in our area.

The presence of natural or man-made contaminants does not necessarily indicate that water poses a health risk. State and federal drinking water standards identify maximum contaminant levels that relate to health risk.

Everyone has a role in protecting groundwater. Well owners should maintain their wells and septic systems, and create a zone of protection around the well where no contaminants are used or stored. See the water district's Guide for the Private Well Owner at **www.valleywater.org** for helpful tips. Residents can help by conserving water and by raising awareness that activities on the land surface can affect our largest drinking water reservoir, which is beneath our feet.



Monitoring confirms generally high groundwater quality, but South County nitrate is a concern

In 2015, the water district sampled over 230 domestic water supply wells and evaluated data from over 225 local water supplier wells. The table below summarizes groundwater quality results for North and South County (see map on back page.) 2015 results show that nearly all wells tested meet drinking water standards with the notable exception of nitrate in South County domestic wells. The water district works with regulatory and land use agencies on this ongoing groundwater protection challenge.

Water from public water systems must meet Maximum Contaminant Levels (MCLs), but domestic systems are not subject to these standards. It should be noted that not every well was tested for all parameters shown, and only parameters that were detected in water supply wells are listed. Water quality standards, including MCLs, are shown to provide context for groundwater quality results. This is a regional summary and may not reflect the water quality in your well since every property and well is unique.

Primary Drinking Water Standards - Public Health Related Standards				North County		South County		
Inorganic Contaminants	UNITS	PRIMARY MCL	PHG	MEDIAN	RANGE	MEDIAN	RANGE	Typical Sources
Aluminum	ppb	1,000	600	12.96	ND - 89	17.73	ND - 220	Erosion of natural deposits
Arsenic	ppb	10	0.004	0.06	ND - 4	0.35	ND - 5	Erosion of natural deposits; glass and electronics production waste
Asbestos	MFL	7	7	ND	ND	0.33	ND - 2.1	Erosion of natural deposits
Barium	ppb	1,000	2,000	110	ND - 290	106	53.7 - 280	Erosion of natural deposits
Chromium (total)	ppb	50	—	1.0	ND - 17	1.57	ND - 17	Erosion of natural deposits; metal plating
Chromium-6 (hexavalent)	ppb	10	0.02	1.4	ND - 6.6	1.18	ND - 9.6	Erosion of natural deposits; metal plating and industrial discharges
Fluoride (natural source)	ppm	2	1	0.10	ND - 0.89	0.05	ND - 0.59	Erosion of natural deposits
Nickel	ppb	100	12	1.1	ND - 1.71	1.02	ND - 6.89	Erosion of natural deposits; discharge from metal industries
Nitrate (as NO3)	ppm	45	45	14.6	ND - 57.1	26	ND - 139	Runoff and leaching from fertilizer use; leaching from septic tanks and sewage; erosion of natural deposits
Nitrate + Nitrite (as N)	ppm	10	10	3.3	4.8 - 7.7	4.75	1.1 - 10	Runoff and leaching from fertilizer use; leaching from septic tanks and sewage; erosion of natural deposits
Nitrite (as N)	ppb	1,000	1,000	ND	ND	216	ND - 400	Runoff and leaching from fertilizer use; leaching from septic tanks and sewage; erosion of natural deposits
Perchlorate	ppb	6	6	ND	ND	1.32	ND - 5.6	Solid rocket propellant, fireworks, explosives, flares, matches, and a variety of industries
Selenium	ppb	50	30	ND	ND	1	ND - 2	Erosion of natural deposits
Radioactive Contaminants								
Gross Alpha	pCi/L	15	—	1.6	ND - 6	1.32	1.32 - 3.32	Erosion of natural deposits
Volatile Organic Chemicals								
1,1,1-Trichloroethane (1,1,1-TCA)	ppb	200	1,000	ND	ND - 1.8	ND	ND	Discharge from metal degreasing sites and other industrial processes
Tetrachloroethene (PCE)	ppb	5	0.06	ND	ND	ND	ND - 2.7	Discharge from industrial processes, dry cleaners, and automotive repair
Total Trihalomethanes (THMs)	ppb	80	—	0.7	0.5 - 1	NA	NA	Discharge from industrial processes, dry cleaners, and automotive repair
Xylenes (total)	ppb	1,750	1,800	ND	ND - 0.5	NA	NA	Discharge from industrial processes, dry cleaners, and automotive repair
Microbiological Contaminants[1]				Present	Absent	Present	Absent	Typical Sources
E. Coli Bacteria				1	25	3	185	Human and animal fecal waste
Total Coliform Bacteria				11	15	67	121	Naturally present in the environment

Notes: 1) The table shows the number of domestic wells tested that had bacteria present or absent. Public water systems are required to ensure that fewer than 5% of samples have total coliform present and that no samples have e.coli present. Domestic wells are not subject to these standards.

Terms and Definitions

Color units: A measure of color in water

Maximum Contaminant Level (MCL): The highest level of a contaminant allowed in public water systems. Primary MCLs are set as close to PHGs as is economically and technologically feasible. Secondary MCLs protect the odor, taste, and appearance of drinking water.

Median: The "middle" value of the results, with half of the values above the median and half of the values below the median.

MFL: = Million Fibers per Liter

NA: Not analyzed

ND: Not detected (at laboratory testing limit)

NTU: Nephelometric Turbidity Units

pCi/L: picoCuries per liter (a measure of radiation)

ppm: parts per million (milligrams per liter)

ppb: parts per billion (micrograms per liter)

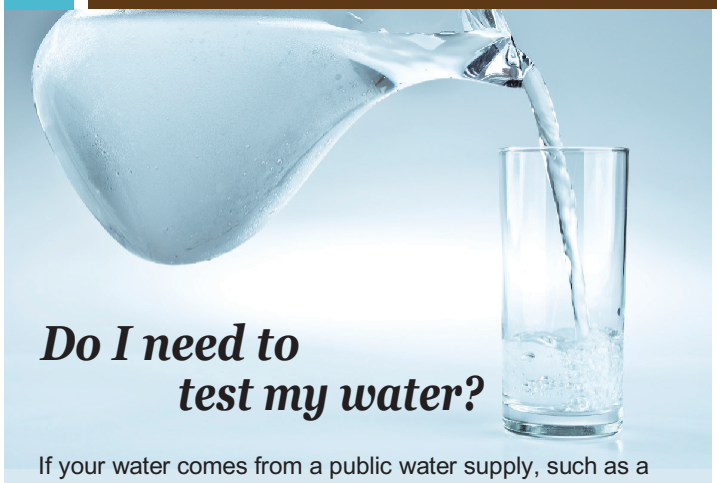
Public Health Goal (PHG): The level of a contaminant in drinking water below which there is no known or expected risk to human health. PHGs are set by the California EPA.

TON: Threshold Odor Number

uS/cm: microSiemens per centimeter (a measure of the dissolved inorganic salt content)

2015 Groundwater Quality Summary

Secondary Drinking Water Standards - Aesthetic Standards	UNITS	SECONDARY MCL	PHG	North County MEDIAN	North County RANGE	South County MEDIAN	South County RANGE	Typical Sources
Chloride	ppm	250	—	48	31 - 151	41	10 - 152	Runoff/leaching from natural deposits; seawater influence
Color	color units	15	—	ND	ND - 9	5	ND - 10	Naturally-occurring organic materials
Copper	ppb	1,000	300	1.22	0.74 - 1.7	3.77	0.85 - 68	Internal corrosion of household plumbing systems; erosion of natural deposits
Foaming Agents (MBAS)	ppb	500	—	ND	ND - 0.05	0.03	ND - 0.05	Non-point source pollution; discharges from industrial processes
Iron	ppb	300	—	29.9	ND - 1,100	14.99	4.4 - 1,500	Leaching from natural deposits; industrial wastes
Manganese	ppb	50	—	ND	ND - 120	0.8	ND - 120	Leaching from natural deposits; industrial wastes
Odor Threshold	TON	3	—	ND	ND - 1	ND	ND - 1	Naturally-occurring organic materials
pH	pH units	6.5 - 8.5	—	6.92	7.46 - 8	7.7	6.99 -8.5	Erosion of natural deposits; carbon dioxide emissions; rainfall
Specific Conductance	uS/cm	900	—	700	420 - 2,100	640	357 - 1,370	Substances that form ions when in water; seawater influence
Sulfate	ppm	250	—	43.4	5.1 - 239	36	5.3 - 140	Runoff/leaching from natural deposits; industrial wastes
Total Dissolved Solids (TDS)	ppm	500	—	410	260 - 620	376	180 - 760	Runoff/leaching from natural deposits
Turbidity	NTU	5	—	0.27	0.1 - 3.9	0.36	ND - 3.8	Soil runoff
Zinc	ppb	5,000	—	25.6	ND - 100	2.1	ND - 100	Runoff/leaching from natural deposits; industrial wastes
Other Water Quality Parameters								
Acifluorfen	ppb			ND	ND - 0.5	NA	NA	Herbicide
Alkalinity (total, as CaCO3)	ppm	—	—	230	81 - 380	190	94 - 370	Atmospheric and vadose zone carbon dioxide
Ammonia (NH3-N)	ppm			ND	ND - 0.05	NA	NA	Runoff and leaching from fertilizer use; leaching from septic tanks and sewage; erosion of natural deposits
Boron	ppb	—	—	ND	ND - 172	106	51.9 - 4,600	Erosion of natural deposits
Bromide	ppm	—	—	0.16	ND - 1.71	0.17	ND - 0.91	Erosion of natural deposits; seawater intrusion; sea spray
Caffeine	ppb	—	—	ND	ND - 0.05	NA	NA	Wastewater
Calcium	ppm	—	—	67	26 - 110	52	5.9 - 107	Erosion of natural deposits
Carbon Dioxide	ppm	—	—	15	2 - 54	NA	NA	Atmospheric sources; dissolution of carbonate rocks
Chloromethane	ppb	—	—	ND	ND	ND	ND - 0.97	Discharge from industrial processes, dry cleaners, and automotive repair
Cobalt	ppb	—	—	ND	ND - 1	ND	ND	Leaching from natural deposits; industrial wastes
Diazinon	ppb	—	—	ND	ND - 0.1	NA	NA	Insecticide
Dichlorodifluoromethane (Freon 12)	ppb	—	—	ND	ND - 12.95	ND	ND	Discharge from industrial processes, dry cleaners, and automotive repair
Diisopropyl Ether	ppb	—	—	ND	ND - 3	ND	ND	Leaking underground storage tanks; discharge from petroleum facilities
Dimethoate	ppb	—	—	ND	ND - 0.1	NA	NA	Insecticide
Hardness (Total, as CaCO3)	ppm	—	—	300	99 - 558	270	ND - 586	Erosion of natural deposits
Lead	ppb		0.2	0.66	ND - 1.06	0.26	ND - 5.6	Erosion of natural deposits; internal corrosion of household water plumbing systems; discharges from industrial manufacturers
Lithium	ppb	—	—	5	ND - 7.5	9.60	ND - 27	Erosion of natural deposits; discharge from industrial uses
Magnesium	ppm			25	8.6 - 58	31.0	9.2 - 72	Erosion of natural deposits
Methiocarb	ppb	—	—	1.13	ND - 2	NA	NA	Pesticide
Metolachlor	ppb			ND	ND - 0.05	NA	NA	Herbicide
Metribuzin	ppb	—	—	ND	ND - 0.05	NA	NA	Herbicide
Molybdenum	ppb	—	—	ND	ND - 2.3	ND	ND - 4.4	Erosion of natural deposits
Orthophosphate	ppm	—	—	0.14	ND - 1.18	0.08	ND - 1.66	Leaching from natural deposits; agricultural runoff
p-Isopropyltoluene	ppb	—	—	ND	ND - 0.5	ND	ND	Discharge from industrial processes, dry cleaners, and automotive repair
Potassium	ppm	—	—	1.2	0.8 - 1.8	1.3	ND - 2.6	Erosion of natural deposits
Propoxur	ppb	—	—	ND	ND - 2	NA	NA	Insecticide
Radium 228	pCi/L	—	0.019	ND	ND	0.045	0.045 - 0.045	Erosion of natural deposits
Silica	ppm	—	—	26.0	24.1 - 27	26.0	18.7 - 43	Erosion of natural deposits
Sodium	ppm	—	—	30.5	16.1 - 69	26.1	14 - 197	Erosion of natural deposits
Tert-Butyl Alcohol	ppb	—	—	ND	ND	ND	ND - 4.1	Discharge from industrial processes, dry cleaners, and automotive repair
Total Organic Carbon (TOC)	ppm	—	—	ND	ND - 0.3	NA	NA	Various natural and manmade sources
Vanadium	ppb	—	—	ND	ND	ND	ND - 12	Erosion of natural deposits; discharge from industrial uses



Do I need to test my water?

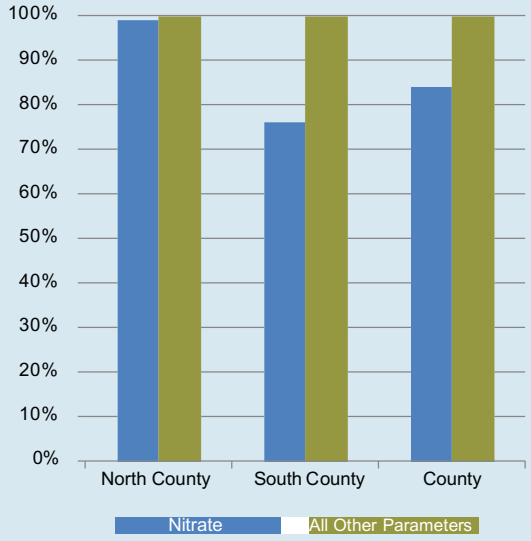
If your water comes from a public water supply, such as a city or water company, it is tested regularly to make sure that it meets state and federal drinking water standards.

If your water comes from a private well, you are responsible for making sure it is safe to drink. Although the water district monitors regional groundwater quality, every property and well has unique conditions. Some contaminants are colorless and odorless, so the first step in protecting your health is having your water tested.

The water district encourages private well owners to have their well water tested by a state-certified laboratory annually or more often if there is a change in taste, odor or appearance. If your water contains any contaminant above drinking water standards, you may want to install a treatment system or use an alternative source of water.

The water district currently offers free basic water quality testing for domestic wells and rebates of up to $500 for nitrate treatment systems — call the Groundwater Hotline at **(408) 630-2300** to find out if you are eligible.

PERCENTAGE OF WATER SUPPLY WELLS TESTED IN 2015 MEETING PRIMARY DRINKING WATER STANDARDS



Hot Topics in Water Quality

Nitrate

As shown in the chart to the left, nitrate is an ongoing groundwater protection challenge, particularly in South County. Common sources are fertilizers, septic systems and livestock waste, so nitrate is often higher in rural and agricultural areas. Nitrate can interfere with the blood's ability to transport oxygen and is of greatest concern for infants and pregnant women. Consuming high levels of nitrate may cause "blue baby syndrome;" symptoms include shortness of breath and blueness of the skin.

The water district monitors nitrate to assess hot spots and trends, recharges groundwater which helps dilute nitrate, and works with other agencies to address nitrate in groundwater. To help reduce domestic well owners' exposure to nitrate in drinking water, the water district is offering rebates of up to $500 for eligible treatment systems. Call the Groundwater Hotline at **(408) 630-2300** for more information.

Perchlorate

Perchlorate is a salt used for rocket fuel, highway flares, fireworks and other uses. Perchlorate can have adverse health effects at high levels as it can interfere with the thyroid gland, which can affect hormones that regulate metabolism and growth. Contamination from a former highway flare manufacturer in Morgan Hill was first discovered in 2000. At the urging of the water district and the community, the Central Coast Regional Water Quality Board has taken timely action to restore groundwater quality.

Due to cleanup activities and groundwater recharge, perchlorate levels have decreased dramatically. The area affected is also getting smaller, now extending from Tennant Avenue south to the San Martin Airport area. A few water supply wells still contain perchlorate above the drinking water standard and remediation by the responsible party is ongoing.

Chromium-6

Chromium-6, a suspected carcinogen, is a naturally occurring metal that is also used in several industrial processes. Geologic deposits containing chromium-6 are present in areas of Santa Clara County. California's drinking water standard of 10 parts per billion (ppb) for Chromium-6 became effective on July 1, 2014.

Lead

Lead and other metals are naturally present at low levels in groundwater due to the erosion of natural deposits. Groundwater is generally not corrosive by nature. Lead may be introduced to drinking water from faucets, plumbing fixtures and lead solder within the home and from lead service lines, if they are present. For more information, please visit **www.valleywater.org**.

You live on a groundwater basin

NORTH COUNTY
Generally extends north from Metcalf Road to San Francisco Bay

SOUTH COUNTY
extends from the Coyote Valley south to the Pajaro River

Health and education information

Drinking water, including bottled water, may reasonably be expected to contain small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained from the U.S. Environmental Protection Agency's Safe Drinking Water Hotline (**800-426-4791**), the CA Division of Drinking Water (**www.waterboards.ca.gov/drinking_water/programs**), the CA Office of Environmental Health Hazard Assessment (**www.oehha.ca.gov/water**), or from your healthcare provider.

CONTACT US

For more information, contact the water district's Groundwater Hotline at **(408) 630-2300.** Or use our **Access Valley Water** customer request and information system at valleywater.org to find out the latest information on district projects or to submit questions, complaints or compliments directly to a district staff person.

Follow us on: /scvwd /valleywater /valleywater

To get eNews, text **VALLEYWATER** to **22828**.

©2016 Santa Clara Valley Water District • 4/16 • PUB 608 ET

Appendix B

2015 Groundwater Quality Results by Subbasin and Zone

Table B-1 Summary of 2015 Water Quality Indicator Data

Parameter	Units[1]	Santa Clara Subbasin, Santa Clara Plain								Santa Clara Subbasin, Coyote Valley			
		Shallow Zone [2]				Principal Zone [3]							
		n[4]	Min[5]	Median[6]	Max	n	Min	Median	Max	n	Min	Median	Max
Aggressive Index (Corrosivit y)	INDEX	--	--	--	--	37	11.47	12	13	3	11.7	11.7	11.75
Alkalinity - Hydroxide As $CaCO_3$	mg/L	13	-5	<5	-5	18	<5	<5	<5	8	<0.5	<5	<5
Alkalinity - Bicarbonate (As $CaCO_3$)	mg/L	13	160	302	597	18	135	227.5	358	8	146	224	282
Alkalinity (Total) As $CaCO_3$	mg/L	13	160	302	597	64	81	229	380	11	133	210	282
Alkalinty - Carbonate (As $CaCO_3$)	mg/L	13	<5	<5	<5	18	-5	<5	9	8	<0.5	<5	<5
Caffeine	ug/L	--	--	--	--	5	-0.05	<0.05	0.05	--	--	--	--
Carbonate (As CO_3)	mg/L	13	<5	<5	<5	38	<5	<5	5	10	<0.5	<5	<10
Color	Color units	--	--	--	--	22	<5		9	2	<3	<3	<3
E. Coli	P/A 100 ml	3	3 Absent	0 Present		1	1	0 Present		22	22 absent	0 Present	
Foaming Agents (MBAS)	ug/L	--	--	--	--	11	<0.05	<0.5	0.05	2	<0.05		<0.05
Hardness (Total) As $CaCO_3$	mg/L	16	229	488	730	66	79	280	465	33	-10	271	459
Heterotrophic Plate Count	CFU/100mL	--	--	--	--	--	--	--	--	--	--	--	--
Hydroxide Alkalinity	mg/L	13	<5	<5	<5	38	<5	<5	5	10	<0.5	<5	<5
Langelier Index @ 60 °C	INDEX	--	--	--	--	18	0.093	0.52	0.89	2	0.42	0.42	0.42
Langelier Index at Source Temp.	INDEX	--	--	--	--	17	-0.56	-0.01	0.3	2	-0.18	-0.18	-0.18
Odor Threshold @ 60 °C	TON	--	--	--	--	38	<1	<1	1	3	<1	1	1
Oxidation Reduction Potential	mV	24	-150	-12.45	85	13	-231	24	693	6	-25		86.25
pH[10]	pH units	42	6.47	7.35	8	133	6.5	7.47	8.3	15	7.1	7.5	7.9
Source Temperature °C	C	29	17.2	20	22.7	78	16	19.1	25.3	6	18.5	19.7	24.3
Specific Conductance [10]	uS/cm	33	571	1,022	2,185	90	387	614	1,020	39	397	643	1020
Total Coliform, MPN Per 100 mL [9]	P/A 100 ml	3	3 Absent	0 Present	--	1	1	0 Present	--	22	13 absent	9 present	
Total Organic Carbon (TOC)	mg/L	--	--	--	--	9	<0.1	<0.3	0.3	--	--	--	--
Turbidity[10]	NTU	42	0.05	0.77	122	68	0.04	0.27	16	16	-0.05	0.48	3

Table B-1 Summary of 2015 Water Quality Indicator Data

Parameter	Units[1]	Llagas Subbasin								Maximum Contaminant Levels	
		Shallow Zone				Principal Zone					
		n	Min	Median	Max	n	Min	Median	Max	MCL	SMCL[8]
Aggressive Index (Corrosivity)	INDEX	--	--	--	--	19	11.4	12	13	--	--
Alkalinity - Hydroxide As $CaCO_3$	mg/L	12	<5	<5	<5	19	<5	<5	<5	--	--
Alkalinity - Bicarbonate (As $CaCO_3$)	mg/L	12	121	171	344	19	94	223	368	--	--
Alkalinity (Total) As $CaCO_3$	mg/L	12	121	171	344	39	94	192	370	--	--
Alkalinty - Carbonate (As $CaCO_3$)	mg/L	12	<5	<5	<5	19	<5	<5	40	--	--
Caffeine	ug/L	--	--	--	--	--	--	--	--	--	--
Carbonate (As CO_3)	mg/L	12	<5	<5	<5	21	<5	<5	24	--	--
Color	Color units	--	--	--	--	9	<3	5	10	--	15
E. Coli	P/A 100 ml	11	9 Absent	2 present		17	17 Absent	0 present		--	--
Foaming Agents (MBAS)	ug/L	--	--	--	--	2	<0.025	0.03	0.05	--	500
Hardness (Total) As $CaCO_3$	mg/L	20	191	281	545	57	<10	252	586	--	--
Heterotrophic Plate Count	CFU/100mL	1	120	120	120	--	--	--	--		
Hydroxide Alkalinity	mg/L	12	<5	<5	<5	21	<5	<5	5	--	--
Langelier Index @ 60 °C	INDEX	--	--	--	--	18	-0.38	0.27	0.7	--	--
Langelier Index at Source Temp.	INDEX	--	--	--	--	1	<0.5	<0.5	<0.5	--	--
Odor Threshold @ 60 °C	TON	--	--	--	--	23	<1	<1	1	--	3
Oxidation Reduction Potential	mV	11	76	123	158.1	19	-44	108	165	--	--
pH[10]	pH units	22	6.75	7.29	7.9	62	6.9	7.7	8.5	--	--
Source Temperature °C	C	11	17	19.3	22.3	19	17.6	19.8	24.5	--	--
Specific Conductance [10]	uS/cm	32	411	629	1,180	136	410	619	1,240	--	900
Total Coliform, MPN Per 100 mL [9]	P/A 100 ml	11	8 Absent	3 present		17	6 Absent	11 Present		--	--
Total Organic Carbon (TOC)	mg/L	--	--	--	--	--	--	--	--	--	--
Turbidity[10]	NTU	22	0.05	0.56	6.8	50	0.07	0.37	17.5	--	5

Notes:

Table includes data for wells monitored by the District (monitoring wells and water supply wells) and public water system data reported to the CA Division of Drinking Water (DDW)

Only wells with known construction information are presented in this table. DDW wells are assumed to represent the principal zone if no construction information is available, as these are typically deep wells.

1. mg/L = milligrams per liter; CFU = Colony Forming Units; uS/cm = microSiemens per centimeter; NTU = Nephelometric Turbidity Units; TON = Threshold Odor Number
2. The shallow aquifer zone is represented by wells primarily drawing water from depths less than 150 feet.
3. The principal aquifer zone is represented by wells primarily drawing water from depths greater than 150 feet.
4. n = number of results for each parameter. Some parameters may have been analyzed in more than one sample from a particular well.
5. The minimum shown is the lowest detected value. The lowest reporting limit (e.g., <5) is shown when there are no quantified values at the lowest reporting limit.
6. For parameters with results reported at multiple reporting limits, the median was computed using the Maximum Likelihood Estimate (MLE) method.
7. MCL = Maximum Contaminant Level specified in Title 22 of the California Code of Regulations. The MCL is a health-based drinking water standard.
8. SMCL = Secondary Maximum Contaminant Level, or aesthetic-based standard, per DDW or US EPA. For SMCLs having a range, the lower, recommended threshold is listed first with the upper threshold in parentheses.
9. A public water system collecting <40 samples/month violates the total coliform MCL if >1 sample is positive or if there is a repeat positive for fecal coliform or *E. coli.* All wells sampled in 2015 were private domestic wells.
10. Summary statistics computed from combined laboratory and field measured data.

Table B-2 Summary of 2015 Inorganic Constituent Data

Parameter	Units[1]	Santa Clara Subbasin, Santa Clara Plain								Santa Clara Subbasin, Coyote Valley			
		Shallow Zone[2]				Principal Zone[3]							
		n[4]	Min[5]	Median[6]	Max	n	Min	Median	Max	n	Min	Median	Max
Major and Minor Ions													
Bicarbonate (As HCO3)	mg/L	13	195	369	729	65	99	280	460	11	162	260	344
Bromate	ug/L	--	--	--	--	3	<5	<5	<5	--	--	--	--
Bromide	mg/L	16	0.09	0.2	0.43	29	<0.05	0.12	0.31	32	<0.05	0.12	0.91
Calcium	mg/L	13	36.4	67.7	141	64	16.2	63	113	11	7	47.1	87
Calcium As CaCO3	mg/L	13	90.9	169	337	19	40.6	134	283	8	17.6	123.5	217
Carbon Dioxide	ug/L	--	--	--	--	19	2,000	15,000	54,000	--	--	--	--
Chloride	mg/L	30	31	62.3	144	65	11	46	151	11	14	40	83
Cyanide	ug/L	--	--	--	--	42	<100	<100	<100	4	<5	<5	<100
Fluoride (Natural Source)	mg/L	16	<0.05	<0.05	0.42	70	<0.1	0.11	0.89	34	<0.05	0.09	0.2
Magnesium	mg/L	13	21.3	45.3	90	64	6.5	25	58	11	22	36.5	72
Perchlorate	ug/L	13	<4	<4	<4	74	<4	<4	<4	13	<4	<4	<4
Potassium	mg/L	13	0.7	1.2	2.5	45	0.9	1.3	4.1	10	0.7	1.28	1.7
Silica	mg/L	13	15	24	32	27	13	25	43	8	18	22	36
Sodium	mg/L	13	24	35	268	64	16	32	109	11	23	26	100
Sodium Adsorption Ratio	ratio	13	0.67	0.98	5.52	58	0.53	0.95	5.84	9	0.6	0.81	3.37
Sulfate	mg/L	16	16	27	294	66	0.8	42	120	33	1.5	41	93
Total Dissolved Solids	mg/L	13	340	498	1490	65	226	400	642	19	300	380	492
Nutrients													
Ammonia	mg/L	--	--	--	--	7	<0.05	<0.05	<0.05	--	--	--	--
Nitrate (as NO3)	mg/L	16	<0.05	9	30	235	<2	13	40	58	<2	24	71
Nitrate (as N)	mg/L	--	--	--	--	14	1.9	5	9	5	1.2	5.7	12
Nitrate + Nitrite (as N)	ug/L	--	--	--	--	19	480	3,300	7,700	7	2,910	4,950	10,000
Nitrite (as N)	ug/L	--	--	--	--	49	<200	<400	<400	19	<400	<400	400
Phospahte, Ortho	mg/L	16	<0.05	0.15	0.9	29	0.05	0.13	1.96	30	<0.05	0.08	0.46
Trace Elements													
Aluminum	ug/L	13	<20	22	80	66	<20	23	380	13	<10	12	200
Antimony	ug/L	13	<1	<1	<1	66	<1	<6	<6	12	<1	<1	<6
Arsenic	ug/L	13	<1	<1	4	66	<1	0.29	4	12	<1	0.81	2
Asbestos	MFL	--	--	--	--	29	<0.2	<0.2	<0.2	--	--	--	--
Barium	ug/L	13	42	87	280	66	<100	112.3	290	12	84	109	260
Beryllium	ug/L	13	<1	<1	<1	66	<1	<1	<1	12	<1	<1	<1
Boron	ug/L	13	78.9	136	683	27	<100	119	281	8	<50	106	139
Cadmium	ug/L	13	<0.2	<0.2	<0.2	66	<0.2	<1	<1	12	<0.2	<0.2	<1
Chromium (Total)	ug/L	13	<1	<1	5.1	68	<1	1.0	17	12	<1	1.18	17
Chromium, Hexavalent	ug/L	13	<1	<1	2.07	51	<1	1.3	8.9	12	<1	1.59	9.6
Cobalt	ug/L	13	<1	<1	<1	28	<1	<1	1	8	<1	<1	<1
Copper	ug/L	13	0.57	1.3	15.6	65	<0.5	1.3	3.4	11	<0.5	1.47	3.8
Iron	ug/L	13	<20	<20	120	102	6.71	20.7	1,300	12	<10	8.1	320
Lead	ug/L	13	<0.5	<0.5	1.06	66	<0.5	<0.5	1.5	11	<0.5	0.78	1.3
Lithium	ug/L	13	-5	7.5	17	27	<5	6.6	25	8	8.2	11.0	21
Manganese	ug/L	13	<1	5.7	380	70	<1	2.1	146	11	<1	1.8	145
Mercury	ug/L	13	<1	<1	<1	66	<1	<1	<1	10	<0.5	<1	<1
Molybdenum	ug/L	13	<1	<1	13	28	<1	<1	10	8	<1	<1	15
Nickel	ug/L	13	<1	1.6	2.6	66	<1	<1	2.1	12	<1	0.77	1.6
Selenium	ug/L	13	<5	<5	5	66	<5	<5	<5	10	<2	1.5	2
Silver	ug/L	13	<1	<1	<1	65	<1	<10	<10	11	<1	<1	<10
Thallium	ug/L	13	<1	<1	<1	66	<1	<1	<1	12	<1	<1	<1
Vanadium	ug/L	13	<3	<3	3.3	28	<3	<3	3.1	8	<3	<3	8.7
Zinc	ug/L	13	<10	<10	<10	64	<10	9.3	100	11	<10	3.3	100

Table B-2 Summary of 2015 Inorganic Constituent Data

Parameter	Units[1]	Llagas Subbasin								Maximum Contaminant Levels	
		Shallow Zone				Principal Zone					
		n	Min	Median	Max	n	Min	Median	Max	MCL[7]	SMCL[8]
Major and Minor Ions											
Bicarbonate (As HCO3)	mg/L	12	147	208.5	420	40	115	237	460	--	--
Bromate	ug/L	--	--	--	--	--	--	--	--	10	--
Bromide	mg/L	21	<0.05	0.11	0.41	38	<0.05	0.18	1.12	--	--
Calcium	mg/L	12	38	55	94	40	5.9	53.3	107	--	--
Calcium As CaCO3	mg/L	12	94	137	234	20	82.3	145	269	--	--
Carbon Dioxide	ug/L	--	--	--	--	--	--	--	--	--	--
Chloride	mg/L	12	14	47	71	41	10	40.75	152	--	250
Cyanide	ug/L	--	--	--	--	27	<5	<100	<100	150	--
Fluoride (Natural Source)	mg/L	21	<0.05	<0.05	0.24	63	<0.05	0.05	0.23	2	--
Magnesium	mg/L	12	19.7	31.1	69	40	9.2	30	66	--	--
Perchlorate	ug/L	12	<4	<4	<4	92	<4	<4	5.6	6	--
Potassium	mg/L	12	<0.5	1.05	1.5	23	<0.5	1.3	2.6	--	--
Silica	mg/L	12	20	27	39	20	20	26	43	--	--
Sodium	mg/L	12	15	23	52	41	14	28	197	--	--
Sodium Adsorption Ratio	ratio	12	0.39	0.69	1.45	40	0.44	0.75	9.87	--	--
Sulfate	mg/L	21	19	35	101	58	11	36	140	--	250
Total Dissolved Solids	mg/L	12	304	412	678	41	180	371	760	--	500
Nutrients											
Ammonia	mg/L	--	--	--	--	--	--	--	--	--	--
Nitrate (as NO3)	mg/L	21	2.4	34	239	152	<0.05	29	124	45	--
Nitrate (as N)	mg/L	--	--	--	--	22	<0.4	4	19	10	--
Nitrate + Nitrite (as N)	ug/L	--	--	--	--	18	1,100	4,450	8,800	10,000	--
Nitrite (as N)	ug/L	--	--	--	--	61	<400	<400	<400	1,000	--
Phospahte, Ortho	mg/L	21	<0.05	0.09	0.27	37	<0.05	0.13	0.9	--	--
Trace Elements											
Aluminum	ug/L	12	<20	27	45	46	<20	16	220	1,000	200
Antimony	ug/L	12	<1	<1	<1	46	<0.5	<6	<6	6	--
Arsenic	ug/L	12	<1	<1	<1	46	<0.5	1.45	5	10	--
Asbestos	MFL	--	--	--	--	4	<0.2	<0.2	2.1	7	--
Barium	ug/L	12	12	100	440	46	<100	113	280	1,000	--
Beryllium	ug/L	12	<1	<1	<1	46	<1	<1	<1	4	--
Boron	ug/L	12	<50	106	137	23	52	106	4,600	--	--
Cadmium	ug/L	12	<0.2	<0.2	<0.2	46	<0.2	<0.5	<1	5	--
Chromium (Total)	ug/L	12	<1	1.35	5.5	46	<1	1.3	10	50	--
Chromium, Hexavalent	ug/L	11	<1	1.16	5.3	29	<1	1.1	5.7	10	--
Cobalt	ug/L	12	<1	<1	<1	20	<1	<1	<1	--	--
Copper	ug/L	12	<0.5	2.35	10.8	41	<0.5	2.7	68	--	1,000
Iron	ug/L	12	<20	<20	49.8	44	<20	9.1	1,500	--	300
Lead	ug/L	12	<0.5	<0.5	0.55	47	<0.2	0.17	5.6	--	--
Lithium	ug/L	12	<5	7.9	27	20	<5	9.6	27	--	--
Manganese	ug/L	12	<1	1.13	48.3	41	<1	1.33	120	--	50
Mercury	ug/L	11	<1	<1	<1	46	<0.05	<1	<1	2	--
Molybdenum	ug/L	12	<1	<1	1.1	20	<1	<1	4.4	--	--
Nickel	ug/L	12	<1	1.3	1.9	46	<1	1.0	6.9	100	--
Selenium	ug/L	12	<5	<5	7	46	<1	<5	<5	50	--
Silver	ug/L	12	<1	<1	<1	40	<0.2	<1	<10	--	100
Thallium	ug/L	12	<1	<1	<1	46	<0.5	<1	<1	2	--
Vanadium	ug/L	12	<3	<3	14	20	<3	<3	12	--	--
Zinc	ug/L	12	<10	<10	<10	40	<10	4.3	160	--	5,000

Notes:

Table includes data for wells monitored by the District (monitoring wells and water supply wells) and public water system data reported to the CA Division of Drinking Water (DDW)

Only wells with known construction information are presented in this table. DDW wells are assumed to represent the principal zone if no construction information is available, as these are typically deep wells.

1. mg/L = milligrams per liter; CFU = Colony Forming Units; uS/cm = microSiemens per centimeter; NTU = Nephelometric Turbidity Units; TON = Threshold Odor Number
2. The shallow aquifer zone is represented by wells primarily drawing water from depths less than 150 feet.
3. The principal aquifer zone is represented by wells primarily drawing water from depths greater than 150 feet.
4. n = number of results for each parameter. Some parameters may have been analyzed in more than one sample from a particular well.
5. The minimum shown is the lowest detected value. The lowest reporting limit (e.g., <5) is shown when there are no quantified values at the lowest reporting limit.
6. For parameters with results reported at multiple reporting limits, the median was computed using the Maximum Likelihood Estimate (MLE) method.
7. MCL = Maximum Contaminant Level specified in Title 22 of the California Code of Regulations. The MCL is a health-based drinking water standard.
8. SMCL = Secondary Maximum Contaminant Level, or aesthetic-based standard, per DDW or US EPA. For SMCLs having a range, the lower, recommended threshold is listed first with the upper threshold in parentheses.
9. A public water system collecting <40 samples/month violates the total coliform MCL if >1 sample is positive or if there is a repeat positive for fecal coliform or *E. coli.* All wells sampled in 2015 were private domestic wells.
10. Summary statistics computed from combined laboratory and field measured data.

Table B-3 Summary of 2015 Volatile Organic Compound (VOC) Data

Parameter	Units[1]	Santa Clara Subbasin, Santa Clara Plain						Santa Clara Subbasin, Coyote Valley			Llagas Subbasin						Maximum Contaminant Levels	
		Shallow Zone [2]			Principal Zone [3]						Shallow Zone			Principal Zone				
		n[4]	Result[5]	RL[6]	n	Result	RL	n	Result	RL	n	Result	RL	n	Result	RL	MCL[7]	SMCL[8]
1,1,1,2-Tetrachlorethane	ug/L	--	--	--	29	ND	<0.5	3	ND	<0.5	1	ND	<0.5	55	ND	<0.5	--	--
1,1,2,2-Tetrachloroethane	ug/L	--	--	--	100	ND	<0.5	4	ND	<0.5	1	ND	<0.5	55	ND	<0.5	1	--
1,1,2-Trichloro-1,2,2-Trifluoroethane (Freon 113)	ug/L	--	--	--	100	ND	<10	4	ND	<10	1	ND	<2		ND	<10	200	--
1,1,2-Trichloroethane	ug/L	--	--	--	100	ND	<0.5	4	ND	<0.5	1	ND	<0.5	55	ND	<0.5	5	--
1,1-Dichloroethane	ug/L	--	--	--	100	ND	<0.5	4	ND	<0.5	1	ND	<0.5	55	ND	<0.5	5	--
1,1-Dichloroethene	ug/L	--	--	--	100	ND	<0.5	4	ND	<0.5	1	ND	<0.5	55	ND	<0.5	6	--
1,1-Dichloro propene	ug/L	--	--	--	29	ND	<0.5	3	ND	<0.5	1	ND	<0.5	55	ND	<0.5	--	--
1,2,3-Trichlorobenzene	ug/L	--	--	--	29	ND	<0.5	3	ND	<0.5	1	ND	<0.5	55	ND	<0.5	--	--
1,2,3-Trichloropropane	ug/L	--	--	--	19	ND	<0.00	1	ND	<0.5	1	ND	<0.5	--	--	--	--	--
1,2,4-Trichlorobenzene	ug/L	--	--	--	100	ND	<0.5	4	ND	<0.5	1	ND	<0.5	55	ND	<0.5	5	--
1,2,4-Trimethylbenzene	ug/L	--	--	--	29	ND	<0.5	3	ND	<0.5	1	ND	<0.5	55	ND	<0.5	--	--
1,2-Dichlorobenzene	ug/L	--	--	--	100	ND	<0.5	4	ND	<0.5	1	ND	<0.5	55	ND	<0.5	600	--
1,2-Dichloroethane	ug/L	--	--	--	100	ND	<0.5	4	ND	<0.5	1	ND	<0.5	55	ND	<0.5	0.5	--
1,2-Dichloropropane	ug/L	--	--	--	100	ND	<0.5	4	ND	<0.5	1	ND	<0.5	55	ND	<0.5	5	--
1,3,5-Trimeth ylbenzene	ug/L	--	--	--	29	ND	<0.5	3	ND	<0.5	1	ND	<0.5	55	ND	<0.5	--	--
1,3-Dichlorobenzene	ug/L	--	--	--	29	ND	<0.5	3	ND	<0.5	1	ND	<0.5	55	ND	<0.5	--	--
1,3-Dichloro propane	ug/L	--	--	--	29	ND	<0.5	3	ND	<0.5	1	ND	<0.5	55	ND	<0.5	--	--
1,3-Dichloro propylene (Total)	ug/L	--	--	--	100	ND	<0.5	4	ND	<0.5	1	ND	<0.5	55	ND	<0.5	0.5	--
1,4-Dichlorobenzene	ug/L	--	--	--	100	ND	<0.5	4	ND	<0.5	1	ND	<0.5	55	ND	<0.5	5	--
1-1-1-Trichloroethane	ug/L	--	--	--	100	D	<0.5	4	ND	<0.5	1	ND	<0.5	55	ND	<0.5	200	--
1-Phenylpropane (n-Pro pylbenzene)	ug/L	--	--	--	29	ND	<0.5	3	ND	<0.5	1	ND	<0.5	55	ND	<0.5	--	--
2,2-Dichloropropane	ug/L	--	--	--	16	ND	<0.5	3	ND	<0.5	1	ND	<0.5	55	ND	<0.5	--	--
2,4-Dinitrotoluene	ug/L	--	--	--	1	ND	<0.1	--	--	--	--	--	--	--	--	--	--	--
2-Chlorotoluene	ug/L	--	--	--	29	ND	<0.5	3	ND	<0.5	1	ND	<0.5	55	ND	<0.5	--	--
4-Chlorotoluene	ug/L	--	--	--	29	ND	<0.5	3	ND	<0.5	1	ND	<0.5	55	ND	<0.5	--	--
Benzene	ug/L	--	--	--	100	ND	<0.5	4	ND	<0.5	1	ND	<0.5	55	ND	<0.5	1	--
Benzo (a) Pyrene	ug/L	--	--	--	27	ND	<0.1	3	ND	<0.1	--	--	--	19	ND	<0.1	0.2	--
Bromobenzene	ug/L	--	--	--	29	ND	<0.5	3	ND	<0.5	1	ND	<0.5	55	ND	<0.5	--	--
Bromochloromethane	ug/L	--	--	--	29	ND	<0.5	3	ND	<0.5	1	ND	<0.5	55	ND	<0.5	--	--
Bromodichloromethane (THM)	ug/L	--	--	--	29	ND	<1	3	ND	<1	1	ND	<0.5	55	ND	<1	--	--
Bromoform (THM)	ug/L	--	--	--	29	ND	<1	3	ND	<1	1	ND	<0.5	55	ND	<1	--	--
Bromomethane	ug/L	--	--	--	16	ND	<0.5	3	ND	<0.5	1	ND	<0.5	55	ND	<0.5	--	--
Carbon Disulfide	ug/L	--	--	--	1	ND	<0.5	--	--	--	--	--	--	--	--	--	--	--
Carbon Tetrachloride	ug/L	--	--	--	100	ND	<0.5	4	ND	<0.5	1	ND	<0.5	55	ND	<0.5	0.5	--
Chloroethane	ug/L	--	--	--	16	ND	<0.5	3	ND	<0.5	1	ND	<0.5	55	ND	<0.5	--	--

Table B-3 Summary of 2015 Volatile Organic Compound (VOC) Data

Parameter	Units[1]	Santa Clara Subbasin, Santa Clara Plain						Santa Clara Subbasin, Coyote Valley			Llagas Subbasin						Maximum Contaminant Levels	
		Shallow Zone [2]			Principal Zone [3]						Shallow Zone			Principal Zone				
		n[4]	Result[5]	RL[6]	n	Result	RL	n	Result	RL	n	Result	RL	n	Result	RL	MCL[7]	SMCL[8]
Chloroform (THM)	ug/L	--	--	--	29	ND	<1	3	ND	<1	1	ND	<0.5	55	ND	<1	--	--
Chloromethane	ug/L	--	--	--	16	ND	<0.5	3	ND	<0.5	1	ND	<0.5	55	D	<0.5	--	--
cis-1,2-Dichloroethene	ug/L	--	--	--	100	ND	<0.5	4	ND	<0.5	1	ND	<0.5	55	ND	<0.5	6	--
Di(2-Ethylhexyl)Adipate	ug/L	--	--	--	27	ND	<5	3	ND	<5	--	--	--	19	ND	<5	400	--
Di(2-Ethylhexyl)Phthalate	ug/L	--	--	--	27	ND	<3	3	ND	<3	--	--	--	19	ND	<3	4	--
Dibromoacetic Acid	ug/L	--	--	--	--	--	--	--	--	--	1	ND	<1	--	--	--	--	--
Dibromochloromethane (THM)	ug/L	--	--	--	29	ND	<1	3	ND	<1	1	ND	<0.5	55	ND	<1	--	--
Dibromochloropropane (DBCP)	ug/L	--	--	--	26	ND	<0.01	3	ND	<0.01	--	--	--	19	ND	<0.01	0.2	--
Dibromomethane	ug/L	--	--	--	29	ND	<0.5	3	ND	<0.5	1	ND	<0.5	55	ND	<0.5	--	--
Dichloroacetic	ug/L	--	--	--	--	--	--	--	--	--	1	ND	<1	--	--	--	--	--
Dichlorodifluoromethane (Freon 12)	ug/L	--	--	--	29	D	<0.5	3	ND	<0.5	1	ND	<0.5	55	ND	<0.5	--	--
Dichloromethane	ug/L	--	--	--	100	ND	<0.5	4	ND	<0.5	1	ND	<0.5	55	ND	<0.5	5	--
Diisopropyl Ether	ug/L	--	--	--	29	D	<3	3	ND	<3	1	ND	<2	55	ND	<3	--	--
Ethylbenzene	ug/L	--	--	--	100	ND	<0.5	4	ND	<0.5	1	ND	<0.5	55	ND	<0.5	300	--
Ethylene Dibromide (EDB)	ug/L	--	--	--	26	ND	<0.02	3	ND	<0.02	--	--	--	19	ND	<0.02	0.05	--
Ethyl-tert-But yl Ether	ug/L	--	--	--	29	ND	<3	3	ND	<3	1	ND	<2	55	ND	<3	--	--
Haloacetic Acids (5) (HAA5)	ug/L	--	--	--	--	--	--	--	--	--	1	ND	<0.5	--	--	--	60	--
Hexachlorobutadiene	ug/L	--	--	--	29	ND	<0.5	3	ND	<0.5	1	ND	<0.5	55	ND	<0.5	--	--
Isopropylbenzene	ug/L	--	--	--	29	ND	<0.5	3	ND	<0.5	1	ND	<0.5	55	ND	<0.5	--	--
m,p-Xylene	ug/L	--	--	--	35	ND	<0.5	3	ND	<0.5	1	ND	<0.5	55	ND	<0.5	--	--
Methyl Ethyl Ketone (MEK, Butanone)	ug/L	--	--	--	20	ND	<5	2	ND	<5	--	--	--	55	ND	<5	--	--
Methyl Isobutyl Ketone	ug/L	--	--	--	20	ND	<5	2	ND	<5	--	--	--	55	ND	<5	--	--
Methyl-tert-But yl-Ether (MTBE)	ug/L	--	--	--	103	ND	<3	4	ND	<3	1	ND	<2	55	ND	<3	13	5
Monobromoacetic Acid (MBAA)	ug/L	--	--	--	--	--	--	--	--	--	1	ND	<1	--	--	--	--	--
Monochloroacetic Acid (MCAA)	ug/L	--	--	--	--	--	--	--	--	--	1	ND	<2	--	--	--	--	--
Monochlorobenzen e	ug/L	--	--	--	100	ND	<0.5	4	ND	<0.5	1	ND	<0.5	55	ND	<0.5	70	--
Naphthalene	ug/L	--	--	--	29	ND	<0.5	3	ND	<0.5	1	ND	<0.5	55	ND	<0.5	--	--
n-Butylbenzene	ug/L	--	--	--	29	ND	<0.5	3	ND	<0.5	1	ND	<0.5	55	ND	<0.5	--	--
o-Xylene	ug/L	--	--	--	35	ND	<0.5	3	ND	<0.5	1	ND	<0.5	55	ND	<0.5	--	--
PCB-1016	ug/L	--	--	--	6	ND	<0.5	1	ND	<0.5	--	--	--	--	--	--	0.5	--
PCB-1221	ug/L	--	--	--	6	ND	<0.5	1	ND	<0.5	--	--	--	--	--	--	0.5	--
PCB-1232	ug/L	--	--	--	6	ND	<0.5	1	ND	<0.5	--	--	--	--	--	--	0.5	--
PCB-1242	ug/L	--	--	--	6	ND	<0.5	1	ND	<0.5	--	--	--	--	--	--	0.5	--
PCB-1248	ug/L	--	--	--	6	ND	<0.5	1	ND	<0.5	--	--	--	--	--	--	0.5	--
PCB-1254	ug/L	--	--	--	6	ND	<0.5	1	ND	<0.5	--	--	--	--	--	--	0.5	--
PCB-1260	ug/L	--	--	--	6	ND	<0.5	1	ND	<0.5	--	--	--	--	--	--	--	--
p-Isopropyltoluene	ug/L	--	--	--	10	D	<0.5	1	ND	<0.5	1	ND	<0.5	--	--	--	--	--

Table B-3 Summary of 2015 Volatile Organic Compound (VOC) Data

Parameter	Units[1]	Santa Clara Subbasin, Santa Clara Plain						Santa Clara Subbasin, Coyote Valley			Llagas Subbasin						Maximum Contaminant Levels	
		Shallow Zone[2]			Principal Zone[3]						Shallow Zone			Principal Zone				
		n[4]	Result[5]	RL[6]	n	Result	RL	n	Result	RL	n	Result	RL	n	Result	RL	MCL[7]	SMCL[8]
Polychlorinated Biphenyls (Total PCB'S)	ug/L	--	--	--	23	ND	<0.5	3	ND	<0.5	--	--	--	11	ND	<0.5	0.5	--
sec-Butylbenzene	ug/L	--	--	--	29	ND	<0.5	3	ND	<0.5	1	ND	<0.5	55	ND	<0.5	--	--
Styrene	ug/L	--	--	--	100	ND	<0.5	4	ND	<0.5	1	ND	<0.5	55	ND	<0.5	100	--
tert-Amyl-Methyl Ether	ug/L	--	--	--	29	ND	<3	3	ND	<3	1	ND	<2	55	ND	<3	--	--
tert-Butyl Alcohol	ug/L	--	--	--	15	ND	<2	3	D	<15	1	ND	<2	55	D	<2	--	--
tert-Butylbenzene	ug/L	--	--	--	29	ND	<0.5	3	ND	<0.5	1	ND	<0.5	55	ND	<0.5	--	--
Tetrachloroethene	ug/L	--	--	--	100	ND	<0.5	4	ND	<0.5	1	ND	<0.5	55	D	<0.5	5	--
Toluene	ug/L	--	--	--	100	ND	<0.5	4	ND	<0.5	1	ND	<0.5	55	ND	<0.5	150	--
Total Trihalomethanes	ug/L	--	--	--	3	D	0.5	--	--	--	--	--	--	--	--	--	80	--
trans-1,2-Dichloroethene	ug/L	--	--	--	100	ND	<0.5	4	ND	<0.5	1	ND	<0.5	55	ND	<0.5	10	--
Trichloroacetic Acid	ug/L	--	--	--	--	--	--	--	--	--	1	ND	<1	--	--	--	--	--
Trichloroethene	ug/L	--	--	--	100	ND	<0.5	4	ND	<0.5	1	ND	<0.5	55	ND	<0.5	5	--
Trichlorofluoromethane (Freon 11)	ug/L	--	--	--	100	ND	<5	4	ND	<5	1	ND	<2.5	55	ND	<5	150	--
Vinyl Chloride	ug/L	--	--	--	100	ND	<0.5	4	ND	<0.5	1	ND	<0.5	55	ND	<0.5	0.5	--
Xylenes (Total)	ug/L	--	--	--	41	D	<1	--	--	--	1	ND	<0.5	--	--	--	1,750	--

Notes:

Table includes data for wells monitored by the District (monitoring wells and water supply wells) and public water system data reported to the CA Division of

Only wells with known construction information are presented. Unless construction is known, DDW wells are assumed to represent the principal zone, as these are typically deep wells.

1. ug/L = micrograms per liter.
2. The shallow aquifer zone is represented by wells primarily drawing water from depths less than 150 feet.
3. The principal aquifer zone is represented by wells primarily drawing water from depths greater than 150 feet.
4. n = number of results for each parameter. Some parameters may have been analyzed more than once at a particular well.
5. ND= not detected above laboratory reporting limit. NA = not analyzed. D = detection above reporting limit.
6. RL = Laboratory reporting limit. In the case of multiple reporting limits, the highest limit is shown. NA is shown if the reporting limit is not available.
7. MCL = Maximum Contaminant Level specified in Title 22 of the California Code of Regulations. The MCL is a health-based drinking water standard.
8. SMCL = Secondary Maximum Contaminant Level, or aesthetic-based standard, per DDW or US EPA.

Table B-4 Summary of 2015 Detected Volatile Organic Compounds (VOCs)

Parameter	Units[1]	Santa Clara Subbasin, Santa Clara Plain								Santa Clara Subbasin, Coyote Valley				Llagas Subbasin								Maximum Contaminant Levels	
		Shallow Zone[2]				Principal Zone[3]								Shallow Zone				Principal Zone					
		n[4]	Min[5]	Median[6]	Max	n	Min	Median	Max	n	Min	Median	Max	n	Min	Median	Max	n	Min	Median	Max	MCL[7]	SMCL[8]
Chloromethane	ug/L	--	--	--	--	16	<0.5	<0.5	<0.5	3	<0.5	<0.5	<0.5	1	<0.5	<0.5	<0.5	55	<0.5	<0.5	**0.97**	--	--
Tetrachloroethene	ug/L	--	--	--	--	100	<0.5	<0.5	<0.5	4	<0.5	<0.5	<0.5	1	<0.5	<0.5	<0.5	55	<0.5	<0.5	**2.7**	5	--
1-1-1-Trichloroethane	ug/L	--	--	--	--	100	<0.5	<0.5	**1.8**	4	<0.5	<0.5	<0.5	1	<0.5	<0.5	<0.5	55	<0.5	<0.5	<0.5	200	--
Dichlorodifluoromethane	ug/L	--	--	--	--	29	<0.5	<0.5	**13**	3	<0.5	<0.5	<0.5	1	<0.5	<0.5	<0.5	55	<0.5	<0.5	<0.5	--	--
tert-Butyl Alcohol	ug/L	--	--	--	--	15	<2	<2	<2	3	**2.7**	**3.4**	**4.1**	1	<2	<2	<2	55	<2	<2	**3.9**	--	--
Xylenes (Total)	ug/L	--	--	--	--	41	<0.5	<0.5	**0.5**	--	--	--	--	1	<0.5	<0.5	<0.5	--	--	--	--	1,750	--
Total Trihalomethanes	ug/L	--	--	--	--	3	**0.5**	**0.7**	**1**	--	--	--	--	--	--	--	--	--	--	--	--	80	--
p-Isopropyltoluene	ug/L	--	--	--	--	10	<0.5	<0.5	**0.5**	1	<0.5	<0.5	<0.5	1	<0.5	<0.5	<0.5	--	--	--	--	--	--
Diisopropyl Ether	ug/L	--	--	--	--	29	<3	<3	**3**	3	<3	<3	<3	1	<2	<2	<2	55	<3	<3	<3	--	--

Notes:
Table includes data for wells monitored by the District (monitoring wells and water supply wells) and public water system data reported to the CA Division of Drinking Water (DDW).

Only wells with known construction information are presented in this table. DDW wells are assumed to represent the principal zone if no construction information is available, as these are typically deep wells.

1. ug/L = micrograms per liter.
2. The shallow aquifer zone is represented by wells primarily drawing water from depths less than 150 feet.
3. The principal aquifer zone is represented by wells primarily drawing water from depths greater than 150 feet.
4. n = number of results for each parameter. Some parameters may have been analyzed more than once at a particular well.
5. The minimum shown is the lowest detected value. The lowest reporting limit (e.g., <5) is shown when there are no quantified values at the lowest reporting limit.
6. For parameters with results with multiple reporting limits, the median was computed using the Maximum Likelihood Estimate method.
7. MCL = Maximum Contaminant Level specified in Title 22 of the California Code of Regulations. The MCL is a health-based drinking water standard.
8. SMCL = Secondary Maximum Contaminant Level, or aesthetic-based standard, per DDW or US EPA.

Table B-5 Summary of 2015 Pesticide Data

Parameter	Units[1]	Santa Clara Subbasin, Santa Clara Plain						Santa Clara Subbasin, Coyote Valley			Llagas Subbasin						Maximum Contaminant Levels	
		Shallow Zone[2]			Principal Zone[3]						Shallow Zone			Principal Zone				
		n[4]	Result[5]	RL[6]	n	Result	RL	n	Result	RL	n	Result	RL	n	Result	RL	MCL[7]	SMCL[8]
2,3,7,8-TCDD (Dioxin)	ug/L	NA	NA	NA	23	ND	<5	3	ND	<0.000005	NA	NA	NA	19	ND	<0.000005	0.00003	--
2,4,5-TP (Silvex)	ug/L	NA	NA	NA	27	ND	<1	6	ND	<1	NA	NA	NA	28	ND	<1	50	--
2,4-D	ug/L	NA	NA	NA	33	ND	<10	7	ND	<10	NA	NA	NA	28	ND	<10	70	--
3-Hydroxycarbofuran	ug/L	NA	NA	NA	22	ND	<3	2	ND	<3	NA	NA	NA	19	ND	<3	--	--
Aciflurfen	ug/L	NA	NA	NA	9	D	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Alachlor	ug/L	NA	NA	NA	23	ND	<1	4	ND	<1	NA	NA	NA	29	ND	<1	2	--
Aldicarb	ug/L	NA	NA	NA	22	ND	<3	2	ND	<3	NA	NA	NA	19	ND	<3	--	--
Aldicarb Sulfone	ug/L	NA	NA	NA	22	ND	<4	2	ND	<4	NA	NA	NA	19	ND	<4	--	--
Aldicarb Sulfoxide	ug/L	NA	NA	NA	22	ND	<3	2	ND	<3	NA	NA	NA	19	ND	<3	--	--
Aldrin	ug/L	NA	NA	NA	22	ND	<0.075	2	ND	<0.075	NA	NA	NA	11	ND	<0.075	--	--
Atrazine	ug/L	NA	NA	NA	29	ND	<0.5	5	ND	<0.5	NA	NA	NA	29	ND	<0.5	1	--
Bentazon	ug/L	NA	NA	NA	27	ND	<2	6	ND	<1	NA	NA	NA	28	ND	<2	18	--
Bromacil	ug/L	NA	NA	NA	13	ND	<10	2	ND	<10	NA	NA	NA	19	ND	<10	--	--
Butachlor	ug/L	NA	NA	NA	13	ND	<0.38	2	ND	<0.38	NA	NA	NA	19	ND	<0.38	--	--
Carbaryl	ug/L	NA	NA	NA	22	ND	<5	2	ND	<5	NA	NA	NA	19	ND	<5	--	--
Carbofuran	ug/L	NA	NA	NA	23	ND	<5	3	ND	<5	NA	NA	NA	19	ND	<5	18	--
Chlordane	ug/L	NA	NA	NA	23	ND	<0.1	3	ND	<0.1	NA	NA	NA	11	ND	<0.1	0.1	--
cis-1,3-Dichloropropene	ug/L	NA	NA	NA	22	ND	<0.5	3	ND	<0.5	1	ND	<0.5	55	ND	<0.5	0.5	--
Dalapon	ug/L	NA	NA	NA	27	ND	<10	6	ND	<10	NA	NA	NA	28	ND	<10	200	--
DCPA (Total di & mono Acid Degradates)	ug/L	NA	NA	NA	5	ND	<0.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	--	--
Diazinon	ug/L	NA	NA	NA	5	D	<0.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	--	--
Dicamba	ug/L	NA	NA	NA	22	ND	<1.5	3	ND	<1.5	NA	NA	NA	28	ND	<1.5	--	--
Dieldrin	ug/L	NA	NA	NA	22	ND	<0.02	2	ND	<0.02	NA	NA	NA	11	ND	<0.02	--	--
Dimethoate	ug/L	NA	NA	NA	5	D	<0.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	--	--
Dinoseb	ug/L	NA	NA	NA	27	ND	<2	6	ND	<1	NA	NA	NA	28	ND	<2	7	--

Table B-5 Summary of 2015 Pesticide Data

Parameter	Units[1]	Santa Clara Subbasin, Santa Clara Plain						Santa Clara Subbasin, Coyote Valley			Llagas Subbasin						Maximum Contaminant Levels	
		Shallow Zone[2]			Principal Zone[3]						Shallow Zone			Principal Zone				
		n[4]	Result[5]	RL[6]	n	Result	RL	n	Result	RL	n	Result	RL	n	Result	RL	MCL[7]	SMCL[8]
Diquat	ug/L	NA	NA	NA	23	ND	<4	3	ND	<4	NA	NA	NA	19	ND	<4	20	--
Endothall	ug/L	NA	NA	NA	23	ND	<45	3	ND	<45	NA	NA	NA	19	ND	<45	100	--
Endrin	ug/L	NA	NA	NA	23	ND	<0.1	3	ND	<0.1	NA	NA	NA	11	ND	<0.1	2	--
Gamma-BHC (Lindane), Total	ug/L	NA	NA	NA	23	ND	<0.2	3	ND	<0.2	NA	NA	NA	11	ND	<0.2	0.2	--
Glyphosate	ug/L	NA	NA	NA	23	ND	<25	3	ND	<15	NA	NA	NA	10	ND	<25	700	--
Heptachlor	ug/L	NA	NA	NA	23	ND	<0.01	3	ND	<0.01	NA	NA	NA	11	ND	<0.01	0.01	--
Heptachlor Epoxide	ug/L	NA	NA	NA	23	ND	<0.01	3	ND	<0.01	NA	NA	NA	11	ND	<0.01	0.01	--
Hexachlorobenzene	ug/L	NA	NA	NA	23	ND	<0.5	3	ND	<0.5	NA	NA	NA	11	ND	<0.5	1	--
Hexachlorocyclopentadiene	ug/L	NA	NA	NA	23	ND	<1	3	ND	<1	NA	NA	NA	11	ND	<1	50	--
Methiocarb	ug/L	NA	NA	NA	14	D	<2	NA	NA	NA	NA	NA	NA	NA	NA	NA	--	--
Methomyl	ug/L	NA	NA	NA	22	ND	<2	2	ND	<1	NA	NA	NA	19	ND	<2	--	--
Methoxychlor	ug/L	NA	NA	NA	23	ND	<10	3	ND	<10	NA	NA	NA	11	ND	<10	30	--
Metolachlor	ug/L	NA	NA	NA	5	D	<0.05	NA	NA	NA	NA	NA	NA	NA	NA	NA	--	--
Metribuzin	ug/L	NA	NA	NA	5	D	<0.05	NA	NA	NA	NA	NA	NA	NA	NA	NA	--	--
Molinate	ug/L	NA	NA	NA	23	ND	<2	3	ND	<1	NA	NA	NA	19	ND	<2	20	--
Oxamyl	ug/L	NA	NA	NA	23	ND	<20	3	ND	<10	NA	NA	NA	19	ND	<20	50	--
Paraquat	ug/L	NA	NA	NA	3	ND	<20	NA	NA	NA	NA	NA	NA	NA	NA	NA	--	--
Pentachlorophenol	ug/L	NA	NA	NA	27	ND	<0.2	6	ND	<0.2	NA	NA	NA	28	ND	<0.2	1	--
Picloram	ug/L	NA	NA	NA	27	ND	<1	6	ND	<1	NA	NA	NA	28	ND	<1	500	--
Propachlor	ug/L	NA	NA	NA	13	ND	<0.5	2	ND	<0.5	NA	NA	NA	19	ND	<0.5	--	--
Propoxur	ug/L	NA	NA	NA	14	D	<2	NA	NA	NA	NA	NA	NA	NA	NA	NA	--	--
Simazine	ug/L	NA	NA	NA	29	ND	<1	5	ND	<1	NA	NA	NA	29	ND	<1	4	--
Terbacil	ug/L	NA	NA	NA	4	ND	<0.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	--	--
Terbuthylazine	ug/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	1	ND	<0.1	NA	NA	NA	--	--
Thiobencarb	ug/L	NA	NA	NA	23	ND	<1	3	ND	<1	NA	NA	NA	19	ND	<1	70	1

Table B-5 Summary of 2015 Pesticide Data

Parameter	Units[1]	Santa Clara Subbasin, Santa Clara Plain						Santa Clara Subbasin, Coyote Valley			Llagas Subbasin						Maximum Contaminant Levels	
		Shallow Zone[2]			Principal Zone[3]						Shallow Zone			Principal Zone				
		n[4]	Result[5]	RL[6]	n	Result	RL	n	Result	RL	n	Result	RL	n	Result	RL	MCL[7]	SMCL[8]
Toxaphene	ug/L	NA	NA	NA	23	ND	<1	3	ND	<1	NA	NA	NA	11	ND	<1	3	--
trans-1,3-Dichloropropene	ug/L	NA	NA	NA	22	ND	<0.5	3	ND	<0.5	1	ND	<0.5	55	ND	<0.5	--	--

Notes:

Table includes data for wells monitored by the District (monitoring wells and water supply wells) and public water system data reported to the CA Division of Drinking Water (DDW).

Only wells with known construction information are presented in this table. DDW wells are assumed to represent the principal zone if no construction information is available, as these are typically deep wells.

1. ug/L = micrograms per liter.
2. The shallow aquifer zone is represented by wells primarily drawing water from depths less than 150 feet.
3. The principal aquifer zone is represented by wells primarily drawing water from depths greater than 150 feet.
4. n = number of results for each parameter. Some parameters may have been analyzed more than once at a particular well.
5. ND= not detected above laboratory reporting limit. NA = not analyzed. D = detection above reporting limit.
6. RL = Laboratory reporting limit. In the case of multiple reporting limits, the highest limit is shown. NA is shown if the reporting limit is not available.
7. MCL = Maximum Contaminant Level specified in Title 22 of the California Code of Regulations. The MCL is a health-based drinking water standard.
8. SMCL = Secondary Maximum Contaminant Level, or aesthetic-based standard, per DDW or US EPA

Table B-6 Summary of 2015 Detected Pesticides

Parameter	Units[1]	Santa Clara Subbasin, Santa Clara Plain								Santa Clara Subbasin, Coyote Valley				Llagas Subbasin								Maximum Contaminant Levels	
		Shallow Zone[2]				Principal Zone[3]								Shallow Zone				Principal Zone					
		n[4]	Min[5]	Median[6]	Max	n	Min	Median	Max	n	Min	Median	Max	n	Min	Median	Max	n	Min	Median	Max	MCL[7]	SMCL[8]
Dimethoate	ug/L	--	--	--	--	5	<0.1	<0.1	**0.1**	--	--	--	--	--	--	--	--	--	--	--	**--**	--	--
Methiocarb	ug/L	--	--	--	--	14	<0.5	< 2	**2**	--	--	--	--	--	--	--	--	--	--	--	**--**	--	--
Propoxur	ug/L	--	--	--	--	14	<0.5	< 2	**2**	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Metolachlor	ug/L	--	--	--	--	5	<0.5	<0.5	**0.5**	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Diazinon	ug/L	--	--	--	--	5	<0.1	<0.1	**0.1**	--	**--**	**--**	**--**	--	--	--	--	--	--	--	**--**	--	--
Metribuzin	ug/L	--	--	--	--	5	<0.5	<0.5	**0.5**	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aciflurfen	ug/L	--	--	--	--	9	<0.5	<0.5	**0.5**	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Notes:

Table includes data for wells monitored by the District (monitoring wells and water supply wells) and public water system data reported to the CA Division of Drinking Water (DDW).

Only wells with known construction information are presented in this table. DDW wells are assumed to represent the principal zone if no construction information is available, as

1. ug/L = micrograms per liter.
2. The shallow aquifer zone is represented by wells primarily drawing water from depths less than 150 feet.
3. The principal aquifer zone is represented by wells primarily drawing water from depths greater than 150 feet.
4. n = number of results for each parameter. Some parameters may have been analyzed more than once at a particular well.
5. The minimum shown is the lowest detected value. The lowest reporting limit (e.g., <5) is shown when there are no quantified values at the lowest reporting limit.
6. For parameters with results with multiple reporting limits, the median was computed using the Maximum Likelihood Estimate method.
7. MCL = Maximum Contaminant Level specified in Title 22 of the California Code of Regulations. The MCL is a health-based drinking water standard.
8. SMCL = Secondary Maximum Contaminant Level, or aesthetic-based standard, per DDW or US EPA.

Table B-7 Summary of 2015 Radioactive Constituent Data

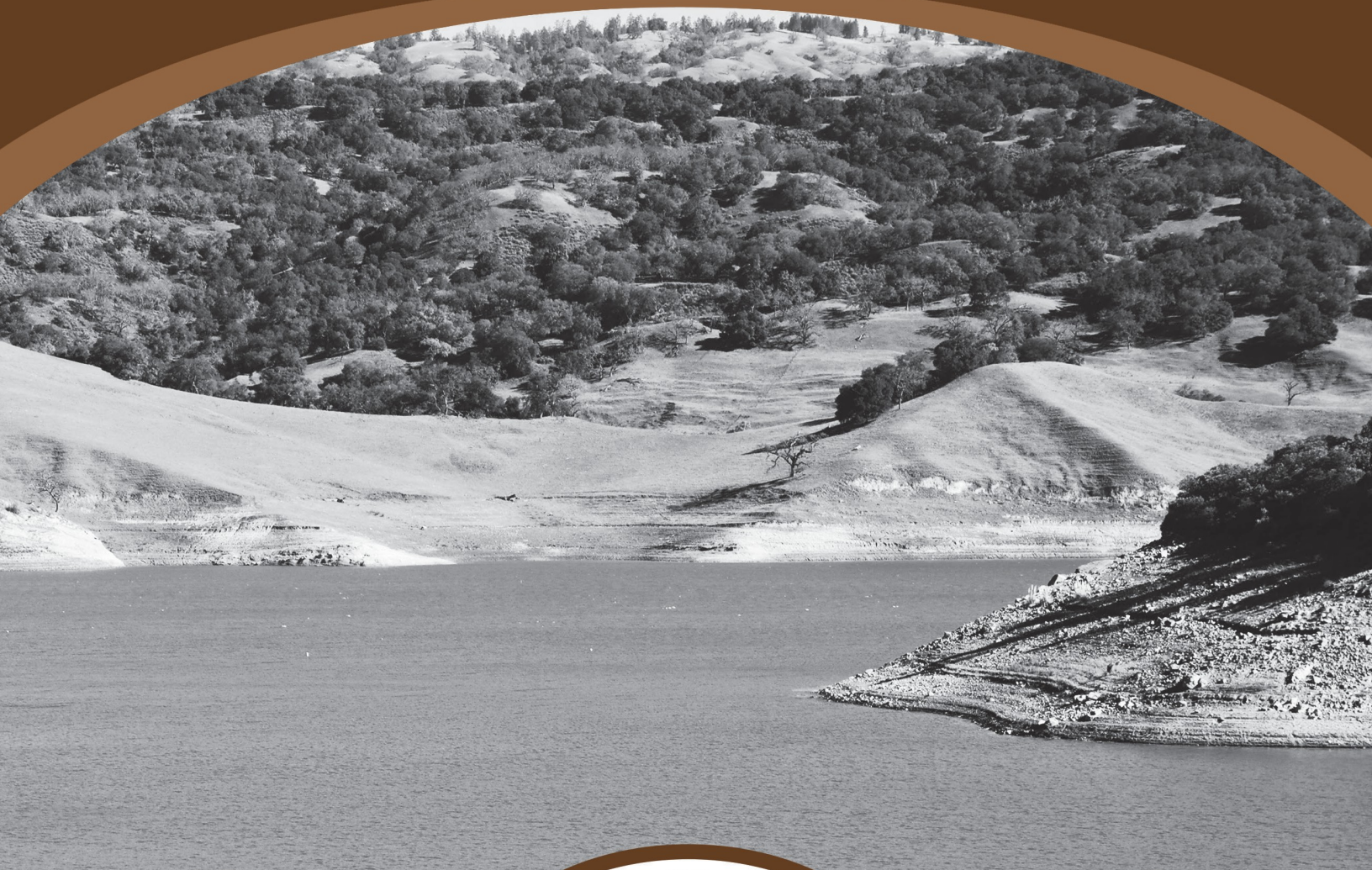
Parameter	Units[1]	Santa Clara Subbasin, Santa Clara Plain								Santa Clara Subbasin, Coyote Valley				Llagas Subbasin								Maximum Contaminant Levels	
		Shallow Zone[2]				Principal Zone[3]								Shallow Zone				Principal Zone					
		n[4]	Min[5]	Median[6]	Max	n	Min	Median	Max	n	Min	Median	Max	n	Min	Median	Max	n	Min	Median	Max	MCL[7]	SMCL[8]
Gross Alpha	*p* Ci/L	--	--	--	--	21	0.05	0.87	6	--	--	--	--	--	--	--	--	19	0.16	0.94	3.3	15	--
Gross Alpha Counting Error	*p* Ci/L	--	--	--	--	21	1.1	2.4	3	--	--	--	--	--	--	--	--	18	0.11	0.15	1.13	--	--
Gross Alpha MDA95	pCi/L	--	--	--	--	21	1.1	2.2	3	--	--	--	--	--	--	--	--	19	0.76	1.17	2.15	--	--
Gross Beta	mrem/yr	--	--	--	--	9	<4	<4	<4	--	--	--	--	--	--	--	--	--	--	--	--	50	--
Gross Beta Counting Error	*p* Ci/L	--	--	--	--	9	1.3	1.36	2.3	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Radium 226	*p* Ci/L	--	--	--	--	10	<1	<1	<1	--	--	--	--	--	--	--	--	--	--	--	--	5	--
Radium 226 Counting Error	pCi/L	--	--	--	--	7	0.11	0.16	0.2	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Radium 226 MDA95	*p* Ci/L	--	--	--	--	10	0.29	0.39	0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Radium 228	*p* Ci/L	--	--	--	--	13	<1	<1	<1	--	--	--	--	--	--	--	--	1	0.045	0.045	0.045	--	--
Radium 228 Counting Error	*p* Ci/L	--	--	--	--	2	0.3	0.3	0.3	--	--	--	--	--	--	--	--	1	0.57	0.57	0.57	--	--
Radium 228 MdaDA95	*p* Ci/L	--	--	--	--	13	0.63	0.89	1.2	--	--	--	--	--	--	--	--	1	0.2	0.2	0.2	--	--
Uranium	*p* Ci/L	--	--	--	--	9	<1	<1	<1	--	--	--	--	--	--	--	--	--	--	--	--	20	--

Notes:

Table includes data for wells monitored by the District (monitoring wells and water supply wells) and public water system data reported to the CA Division of Drinking Water (DDW)

Only wells with known construction information are presented in this table. DDW wells are assumed to represent the principal zone if no construction information is available, as these are typically deep wells

1. *p* Ci/l = picocuries per liter; mrem/yr = millirem per year
2. The shallow aquifer zone is represented by wells primarily drawing water from depths less than 150 feet.
3. The principal aquifer zone is represented by wells primarily drawing water from depths greater than 150 feet
4. n = number of results for each parameter. Some parameters may have been analyzed more than once at a particular well.
5. The minimum shown is the lowest detected value. The lowest reporting limit (e.g., <5) is shown when there are no quantified values at the lowest reporting limit
6. For parameters with results with multiple reporting limits, the median was computed using the Maximum Likelihood Estimate (MLE) method.
7. MCL = Maximum Contaminant Level specified in Title 22 of the California Code of Regulations. The MCL is a health-based drinking water standard
8. SMCL = Secondary Maximum Contaminant Level, or aesthetic-based standard, per DDW or US EPA.



Santa Clara Valley Water District
5750 Almaden Expressway, San Jose, CA 95118-3686
Phone: (408) 265-2600 Fax: (408) 266-0271
www.valleywater.org

© 2016 Santa Clara Valley Water District • 08/2016 • PUB 609